

There are a number of issues with the EPA's "Draft Revised Environmental Justice Analysis for the Proposed UIC Permitting Actions for the Dewey-Burdock Uranium In-Situ Recovery Project in the Southern Black Hills Region of South Dakota" document.

In this document, the EPA describes the adjusted EJ Study Area from 2017 to 2019 thus:

"The EPA's 2017 draft EJ analysis included a Study Area comprised of a 20-mile buffer zone measured from the approximate Dewey-Burdock Project Area Boundary. The EPA conducted a preliminary EJ screening process of the Study Area based upon demographic and environmental indicators, as well as a more targeted preliminary screening of an area comprised of a 5-mile radius around Edgemont, South Dakota, which lies within the Study Area. Based on the preliminary screening processes and additional evaluation, the EPA Region 8 considers the City of Edgemont, South Dakota to be a potentially overburdened community.

This revised EJ analysis expands the geographic scope of the draft EJ analysis to include the Black Hills as a sacred site to many Tribal Nations and Tribal members. The revised analysis includes information on the Black Hills that the EPA received during Tribal consultation discussions as well as the public participation processes and describes historic and current information on mining activities in the Black Hills. Based on this information, the EPA proposes to identify Tribal Nations and Tribal members with interests in the Black Hills as a sacred site as potentially overburdened populations" (47).

The EPA states that following from public comments received in 2017, they have adjusted their analysis in two ways:

"(1) the geographic scope of the analysis is expanded to include the Black Hills which, in its entirety, extends far beyond 20 miles from the proposed project area; and (2) although the formal Indian Reservations of potentially affected Indian tribes are located well beyond the 20-mile radius, this revised analysis considers tribal interests in the Black Hills regardless of where the majority of tribal members may reside" (31).

Beginning on p. 33, the EPA discusses contamination issues resulting from historic mining in the Black Hills.

Later, the EPA cites a 2018 NRC-contracted literature review "of existing information about historic, cultural, and religious resources of significance to Tribes for purposes of its National Environmental Policy Act analysis for the Dewey-Burdock project. The Report includes Information on the historical and present-day significance of the Black Hills to many Tribes" (41).

The EPA also refers to the treaty history relevant to the Dewey-Burdock area, citing the 1851 and 1868 Fort Laramie treaties and the 1980 Supreme Court decision.

The EPA largely sidesteps both treaty and cultural issues thus:

"The EPA is aware of the Sioux Nation's continued claim to the lands subject to the Fort Laramie Treaty of 1868, the Supreme Court's ruling cited above, as well as the longstanding treaty disputes between Native American tribes and the United States. In its role as a regulatory agency, the EPA lacks the authority to resolve these disputes" (31).

"The Black Hills is a sacred site to many Tribal Nations and Tribal members. Tribal Nations and Tribal members describe impact by historic and present-day mining activities in the Black Hills not only with regard to environmental and other impacts to physical resources, but also based their interests in the preservation of the area for spiritual, religious and cultural purposes. While recognizing these interests, the EPA's authorities to address potential impacts from its SDWA actions are limited to the protection of underground sources of drinking water. More specifically, the EPA may regulate to protect groundwater that supplies or can reasonably be expected to supply any public water system from any contaminant that may be present as a result of underground injection activities. SDWA § 1421(d)(2); see also 40 C.F.R. §144.12(a). The purpose of the UIC regulations is to prevent the movement of fluids containing contaminants into USDWs if the presence of those contaminants may cause a violation of a primary drinking water regulation or otherwise adversely affect human health. See 40 C.F.R. § 144.12(a)." (43).

The deficiencies of this analysis include, but are not limited to:

1. **EPA's reliance on the NRC's cultural resources analysis.** The EPA should not use any aspect of the NRC's cultural resources analysis, given that the NRC process is currently tied up in legal proceedings with the Oglala Sioux Tribe over Powertech's controversial analysis of groundwater impacts, waste disposal sites, mitigation measures, and cultural resources. In particular, the US Court of Appeals for the District of Columbia ruled in 2018 that the NRC staff has failed to properly identify and consider impacts to cultural resources related to the proposed Dewey-Burdock project, per the National Environmental Policy Act. Citing the 2018 NRC-contracted literature review to discuss cultural matters related to the Dewey-Burdock site is thus inappropriate.
2. **Separation of treaty/legal and cultural issues from technical/scientific issues.** The EPA is appearing to separate treaty issues and the significance of the Black Hills as a sacred site from their technical responsibility to protect underground sources of drinking water. However, the EPA must consider potential adverse impacts to human health from a cultural perspective as well as from a technical/scientific perspective, and the EPA must remember that per Article 6 of the US Constitution, treaties remain the supreme law of the land. The EPA cannot separate scientific and technical questions from cultural and legal questions. And the impacts from historic mining in the Black Hills region, detailed in section 7.4 of the Draft Revised Environmental Justice Analysis, must be meaningfully considered, not simply acknowledged and dismissed.
3. **Failure to meaningfully consider potential impacts to Oglala Sioux Tribal lands, especially given impacts of historic mining activities.** Given that the proposed Dewey-Burdock site is

up gradient from the Pine Ridge Indian Reservation, and given that the proposed Dewey-Burdock site sits very near to the Cheyenne River, which flows along the northwestern boundary of the Pine Ridge Indian Reservation, specific impacts to Oglala Sioux Tribal lands and communities must be considered. The EPA says it has expanded the geographic scope of its EJ analysis since 2017, but it still does not take into account potential impacts to reservation communities, in particular those communities which have been proven detrimentally impacted by mining activities in the past, including Red Shirt and communities along the White River.<sup>1</sup> In relation to potential impacts to Oglala Sioux Tribal lands and communities, the following must be meaningfully considered:

- a. Crow Butte ISL operation near Crawford<sup>2</sup>
- b. 1962 tailings spill in Edgemont, SD<sup>3</sup>
- c. Historic uranium mining in the greater southern Black Hills area<sup>3</sup>
- d. Oil and gas operations in Converse County, Wyoming<sup>4</sup>
- e. Historic and ongoing uranium mining operations in Wyoming headwaters region, including the first low pH (acid) ISL uranium operation in the US, Peninsula/Strata's Ross Project<sup>5</sup>
- f. Wastewater disposal by the City of Edgemont into the Cheyenne River, which involved effluent violations of pH in 2015 and 2016<sup>6</sup>

4. **Impacts related to waste disposal plan at White Mesa.** In both the 2017 and 2019 versions of the Draft Environmental Justice Analysis, the EPA considers the addition of Dewey-Burdock waste material to the White Mesa Mill to be “not significant.” Numerous issues have been documented in relation to the White Mesa Mill, including transportation incidents<sup>7 8</sup>, questionable remaining storage capacity as companies increase the amount of waste material sent to the Mill<sup>9</sup>, and groundwater contamination. Given these issues, and given the proximity of the Mill to the Ute Mountain Ute White Mesa community, the impacts of sending Dewey-Burdock waste material to White Mesa merit further consideration by the EPA.

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<sup>1</sup> Women of All Red Nations. "Radiation: Dangerous to Pine Ridge Women." Akwesasne Notes, Mohawk Nation via Roosevelttown, NY. Spring, 1980; LaDuke, Winona, and Ward Churchill. 1985. "Native America: The Political Economy of Radioactive Colonialism." *Journal of Ethnic Studies* 13 (3): 107–32.

<sup>2</sup> See Appendix A for list of license violations and reportable events at Crow Butte.

<sup>3</sup> Sharma, Rohit K., Keith D. Putirka, and James J. Stone. 2016. "Stream Sediment Geochemistry of the Upper Cheyenne River Watershed within the Abandoned Uranium Mining Region of the Southern Black Hills, South Dakota, USA." *Environmental Earth Sciences* 75 (9): 823.

<sup>4</sup> See Appendix B, Oglala Sioux Tribe Resolution No. 18-55XB.

<sup>5</sup> For particular impacts resulting from low pH ISL uranium operations elsewhere in the world, see Mudd, G. M. 2000. "Acid In Situ Leach Uranium Mining: 1 - USA and Australia." Tailings & Mine Waste: 517-526 and Mudd, G. M. 1998. "An Environmental Critique of In Situ Leach Mining: The Case Against Uranium Solution Mining." A Research Report for Friends of the Earth (Fitzroy) with The Australian Conservation Foundation.

<sup>6</sup> See Appendix C, Statement of Basis for the City of Edgemont's Surface Water Discharge Permit.

<sup>7</sup> See Appendix D for documentation of transportation incident at White Mesa Mill.

<sup>8</sup> See Appendix E for documentation of barium sulfate sludge spill near entrance of White Mesa Mill.





<sup>9</sup> See Appendix F for documentation of Energy Fuels Resources request to dispose of more ISL material at White Mesa.

# Summary of Comments on All Public Comments Regarding the Revised Dewey-Burdock Uranium In-Situ-vr.pdf

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Issues with the Draft Environmental Justice Analysis are closely related to the EPA's Draft Cumulative Effects Analysis, and thus if the aforementioned concerns do not directly apply to matters of Environmental Justice, as the EPA sees it, then they should be relevant to matters of Cumulative Effects.


## Appendix A

## License Violations and reportable events at Crow Butte ISL uranium mine (Nebraska)<sup>10</sup>

- Aug. 22, 2019: Monitor well excursion
- July 11, 2019: Production well fails 5-year mechanical integrity test
- June 24, 2019: Production well fails 5-year mechanical integrity test
- June 5, 2019: Monitor well excursion
- May 29, 2019: Evaporation Pond 1 liner leak
- May 2, 2019: Monitor well excursion
- Apr. 18, 2019: Monitor well excursion
- Apr. 9, 2019: Monitor well excursion
- Mar. 27, 2019: Monitor well excursion
- Mar. 25, 2019: Monitor well excursion
- Nov. 28, 2018: Monitor well excursion
- June 1, 2018: Monitor well excursion
- Sep. 12, 2017: 27,287 gallon spill of injection solution
- Aug. 29, 2017: Monitor well excursion
- July 27, 2017: Production well fails 5-year mechanical integrity test
- Mar. 14, 2017: Injection well fails 5-year mechanical integrity test
- June 8, 2016: Evaporation Pond 1 liner leak
- May 5, 2016: two Monitor well excursions
- Apr. 21, 2016: Monitor well excursion
- Apr. 20, 2016: Injection well fails 5-year mechanical integrity test
- Nov. 19, 2015: Monitor well excursion
- Oct. 27, 2015: Monitor well excursion
- Aug. 17, 2015: Injection well fails 5-year mechanical integrity test
- Aug. 13, 2015: Monitor well excursion
- July 9, 2015: Monitor well excursion
- July 2, 2015: Injection well fails 5-year mechanical integrity test
- June 3, 2015: Monitor well excursion
- May 28, 2015: Monitor well excursion
- May 27, 2015: Monitor well excursion
- May 21, 2015: Monitor well excursions
- May 19, 2015: Monitor well excursion
- Apr. 14, 2015: Monitor well excursion
- Feb. 11, 2015: Monitor well excursion
- July 22, 2014: Monitor well excursion
- July 2, 2014: Failure to sample the underdrains of a leaking pond and to submit a corrective action plan
- May 20, 2014: Monitor well excursion
- May 8, 2014: Monitor well excursion
- May 7, 2014: Evaporation Pond 1 liner leak
- Dec. 10, 2013: Monitor well excursion
- Sep. 11, 2013: Monitor well excursion
- Aug. 22, 2013: Well fails 5-year mechanical integrity test
- Aug. 6, 2013: Well fails 15-year mechanical integrity test
- Jun. 5, 2013: Radiation dose in unrestricted area exceeds 0.02 mSv/h standard

<sup>10</sup> Downloaded 5 December 2019 from <https://www.wise-uranium.org/umopusa.html#NE>.

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Appendix A

Crow Butte U ISL violations

- Mar. 14, 2013: Evaporation Pond 1 liner leak
- Jan. 18, 2013: Well fails mechanical integrity test
- Oct. 24, 2012: Well fails 20-year mechanical integrity test
- Aug. 20, 2012: Well fails 5-year mechanical integrity test
- June 4, 2012: Well fails 5-year mechanical integrity test
- May 25, 2012: Monitor well fails 15-year mechanical integrity test
- Oct. 7, 2011: Monitor well excursion
- Aug. 9, 2011: Exceedance of Well Head Manifold Pressure Limitations
- July 18, 2011: two wells fail 5-year mechanical integrity test
- June 1, 2011: Evaporation Pond 1 liner leak
- May 27, 2011: two Monitor well excursions
- May 24, 2011: Monitor well excursion
- Mar. 16, 2011: Monitor well excursion
- Jan. 13, 2011: Monitor well excursion
- July 8, 2010: Monitor well excursion
- July 6, 2010: Well fails 5-year mechanical integrity test
- June 22, 2010: Excursions at two monitor wells "due to increased groundwater levels"
- June 22, 2010: Monitor well excursion
- June 16, 2010: Excursions at three monitor wells "due to increased groundwater levels"
- June 11, 2010: Evaporation Pond 3 liner leak detected
- May 10, 2010: Well fails 5-year mechanical integrity test
- Apr. 13, 2010: Excursion at monitor well due to "natural conditions"
- Dec. 31, 2009: Evaporation Pond 4 Liner Leak
- Nov. 19, 2009: Well fails 15-year mechanical integrity test
- Oct. 15, 2009: Mechanical integrity test missed for two wells
- June 18, 2009: Evaporation Pond 4 liner leak detected
- June 11, 2009: Monitor well excursion
- June 5, 2009: Evaporation Pond 1 liner leak detected
- April 27, 2009: Monitor well placed on excursion status
- April 17, 2009: Production well fails 5-year mechanical integrity test
- June 4, 2008: Exceedance of Well Head Manifold Pressure Limitations
- May 31, 2008: Monitor well placed on excursion status
- May 23, 2008: [\\$50,000 penalty imposed for violations](#)
- May 19, 2008: Monitor well placed on excursion status
- April 29, 2008: Five-year mechanical integrity test missed for 42 wells
- September 26, 2006: Monitor well placed on excursion status
- May 5, 2006: leak detected at Pond 4
- January 19, 2006: Monitor well placed on excursion status
- October 27, 2005: Injection well leak detected
- August 4, 2005: Monitor well placed on excursion status
- June 28, 2005: Monitor well placed on excursion status
- June 17, 2005: Monitor well placed on excursion status
- May 2, 2005: Monitor well placed on excursion status
- May 14, 2004: leak detected at Pond 1
- December 23, 2003: Monitor well placed on excursion status
- December 26, 2002: Monitor well placed on excursion status
- September 10, 2002: Monitor well placed on excursion status
- April 4, 2002: Monitor well placed on excursion status

- December 4, 2001: Monitor well placed on excursion status
- March 2, 2001: Monitor well placed on excursion status
- September 10, 2000: Monitor well placed on excursion status
- May 26, 2000: Monitor well placed on excursion status
- April 27, 2000: Monitor well placed on excursion status
- March 6, 2000: Monitor well placed on excursion status
- July 2, 1999: Monitor well placed on excursion status
- August 7, 1998: Spill of 10,260 gallons of injection fluid
- March 21, 1998: Monitor well placed on excursion status
- August 12, 1997: Discovery of Pinhole Leaks in Upper Liner of Process Water Evaporation Pond

(details on post-Nov.1,1999, events available through [ADAMS](#) , Docket No. 04008943)

## Appendix B

RESOLUTION NO. 18-55XB

RESOLUTION OF THE EXECUTIVE COMMITTEE  
OF THE OGLALA SIOUX TRIBE  
(An Unincorporated Tribe)

RESOLUTION OF THE EXECUTIVE COMMITTEE OF THE OGLALA SIOUX TRIBE REQUESTING GOVERNMENT-TO-GOVERNMENT CONSULTATIONS WITH THE UNITED STATES BUREAU OF LAND MANAGEMENT AND THE UNITED STATES FISH AND WILDLIFE SERVICE ON THE FINDINGS OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE CONVERSE COUNTY (WYOMING) OIL AND GAS PROJECT.

OST authority to protect its tribal trust property

WHEREAS, the Oglala Band of the Teton Sioux is a sovereign band of Indians with attendant powers that reorganized the "Oglala Sioux Tribe of the Pine Ridge Indian Reservation" ("OST") by adopting the benefits of the Indian Reorganization Act ("IRA") of June 18, 1934, (25 U.S.C. § 5101 et seq.), and a Constitution and Bylaws under Section 16 of the Act, (25 U.S.C § 5123), and

WHEREAS, Article III, Section 1 of the Tribal Constitution provides that the governing body of the Oglala Sioux Tribe is the "Oglala Sioux Tribal Council," and


WHEREAS, the Tribal Constitution empowers the Tribal Council to:

1. "To negotiate with the Federal, State, and local governments, on behalf of the tribe, and to advise the representatives of the Interior Department on all activities of the Department that may affect the Pine Ridge Indian Reservation" under Article IV, Section 1 (a);
2. To protect and preserve the property, wild life and natural resources - gases, oil, and other materials, etc. - of the tribe . . ." under Article IV, Section 1 (m); and
3. "To adopt laws protecting and promoting the health and general welfare of the Oglala Sioux Tribe and its membership" under Article IV, Section 1 (w), and

The 1825, 1851 and 1868 Treaties

WHEREAS, the OST enjoys all of the rights and privileges guaranteed under its existing treaties with the United States in accordance with (25 U.S.C. § 71) and (25 U.S.C. § 5128), including rights and privileges under the Treaty of July 5, 1825 with the Sioune and Oglala Tribes (7 Stat. 252), the Fort Laramie Treaty of September 17, 1851 (11 Stat. 749), and the Fort Laramie Treaty of April 29, 1868 (15 Stat. 635), and

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Appendix B

OST Resolution 18-55XB

signed March 2018

Requests consultation with the BLM & USFWS on the draft EIS for the Converse County, WY oil and gas project.

Includes discussion on reserved water & fishing rights in Treaty area and on Pine Ridge Reservation, trust status and cultural resources and sacred sites

RESOLUTION NO. 18-55XB

Page Two

WHEREAS, the following 1825 Treaty provisions are pertinent and are directly applicable to the Draft Environmental Impact Statement ("Draft EIS") for the Converse County (Wyoming) Oil and Gas Project:

1. Article 2 of the 1825 Treaty, which provided that the OST agreed that it "reside[d] within the territorial limits of the United and . . . claim[ed] their protection", and
2. The Article 3 of the 1825 Treaty, which provided that the United States "agreed to bring the OST "under their protection . . . .", and
3. Under Articles 2 and 3 of the 1825 Treaty, the OST became a protectorate nation of the United States and established the initial *government-to-government and trust* relationship between the OST and the United States, and

WHEREAS, since the ratification of the 1825 Treaty, the trust relationship between the United States and OST (and other Indian tribes) has been continuously recognized by U.S. Presidents and the U.S. Congress as follows:

1. In President Clinton's Executive Order 13175 of November 6, 2000 (Consultation and Coordination With Tribal Governments), which provides in Sections 2 (a) that the "Federal Government has enacted numerous statutes and promulgated numerous regulations that establish and define a trust relationship with Indian tribes . . . ." and in Section 3 (a) that "[a]gencies shall respect Indian tribal self-government and sovereignty, honor tribal treaty and other rights, and strive to meet the responsibilities that arise from the unique legal relationship between the Federal government and Indian tribal governments";
2. In Acts of Congress, including the Mni Wiconi Act of October 24, 1988, P.L. 100-516, 102 Stat. 2566, which acknowledged in Section 2. (a) (4) that "the United States has a trust responsibility to ensure that adequate and safe water supplies are available to meet the economic, environmental, water supply and public needs of the Pine Ridge Indian Reservation"; and
3. In federal court decisions, including *Blue Legs v. U.S. Bureau of Indian Affairs*, 867 F.2d ,1094, 1100 (8<sup>th</sup> Cir. 1989) ("[t]he existence of a trust duty between the United States and an Indian or Indian tribe can be inferred from the provisions of a statute, treaty or other agreement, reinforced by the undisputed existence of a general trust relationship between the United States and the Indian people"); and *Covelo Indian Community v. FERC*, 895 F.2d 581 (9<sup>th</sup> Cir. 1990) (all government agencies have

"fiduciary" responsibilities to tribes, and must always act in the interests of the beneficiaries), and

WHEREAS, Article 5 of the 1851 Treaty is pertinent and directly applicable to the Draft Environmental Impact Statement ("EIS") for the Converse County Oil and Gas Project as follows:

1. Article 5 described and acknowledged the ownership of the OST and other Teton Sioux and Yankton Sioux signatory tribes to a 60 million acre tract of territory, and fishing and travel rights, described as follows:

The aforesaid Indian nations do hereby recognize and acknowledge the following tracts of country, included within the metes and boundaries hereinafter designated, as their respective territories, viz: The territory of the Sioux or Dahcotah Nation, commencing the mouth of the White Earth River, on the Missouri River: thence in a southwesterly direction to the forks of the Platte River: thence up the north fork of the Platte River to a point known as the Red Butte, or where the road leaves the river; thence along the range of mountains known as the Black Hills, to the head-waters of Heart River; thence down Heart River to its mouth; and thence down the Missouri River to the place of beginning. \* \* \* It is, however, understood that, in making this recognition and acknowledgement, the aforesaid Indian nations do not hereby abandon or prejudice any rights or claims they may have to other lands; and further, that they do not surrender the privilege of . . . fishing or passing over any of the tracts of country heretofore described.

2. All of Converse County, Wyoming, north of the North Platte River is located within the 1851 Sioux Treaty territory;
3. The "Sioux or Dahcotah Nation" with which the United States negotiated at Fort Laramie and in which title was recognized by the Treaty of September 17, 1851, included the Teton and Yankton divisions of Sioux, see *Sioux Nation v. United States*, 24 Ind. Cl. Comm. 147 (1970); and
4. The OST is one of seven Teton Sioux bands that are parties to the 1851 Treaty, and therefore has existing, unextinguished water and fishing rights within Converse County; and
5. Water rights, fishing rights and access rights, and the right to exercise such rights (among other rights) over property are classified as "usufructuary rights," but such OST's rights under the 1851 Treaty in Converse County, Wyoming should not be construed as an abandonment of the OST's underlying claims to

the 1851 Treaty territory in Wyoming as asserted and claimed by the OST in Indian Claim Commission Docket 74, and as articulated in part by Judge Newman's dissenting opinion in *Oglala Sioux Tribe and Rosebud Sioux Tribe v. United States*, 862 F2d 275 ([Fed. Cir. 1988), and

WHEREAS, Article 2 of the 1868 Treaty is also pertinent and directly applicable to the Draft Environmental Impact Statement ("EIS") for the Converse County Oil and Gas Project as follows:

1. Article 2 established the Great Sioux Reservation in western South Dakota; and
2. The Pine Ridge was carved out of the Great Sioux Reservation by Section 1 of the Act of March 2, 1889, 25 Stat. 888; and
3. The Cheyenne River also abuts the Pine Ridge Indian Reservation and so the middle channel of the river where it abuts the reservation is located within the boundaries of the reservation.

**OST water and fishing rights in Converse County, Wyoming**

WHEREAS, the OST has rights (along with other 1851 Treaty signatory Sioux tribes) in the territory constituting Converse County, Wyoming, including but are not limited to, the following:

1. Existing, unquantified OST aboriginal water rights in the Cheyenne River that traverses Converse County, Wyoming from its headwaters to the South Dakota state line (and includes the interconnecting ground water system that supplies water to the river) based on exclusive use and occupation of the 1851 Treaty territory "for a long time," see, e.g., *Turtle Mountain Band v. United States*, 23 Ind. Cl. Comm. 315 (1970) (exclusive use and occupation "for a long time" by a tribe is sufficient to give aboriginal title);
2. Existing unquantified OST Winters Doctrine water rights in the Cheyenne River, which abuts the Pine Ridge Indian Reservation, to fulfill the present and future water needs of the reservation under the doctrine, including the right to use such water rights for beneficial uses that includes maintaining wildlife habitat, i.e., fishing rights and irrigation;
3. Existing, unextinguished fishing rights in the Cheyenne River that includes;
  - a. A corresponding 1851 Treaty right to maintain the Cheyenne River inhabitable for the OST's fisheries from the

headwaters of the river in Converse County to the South Dakota state line, i.e., water rights that impose a duty on BLM and F&WLS to protect both the OST's water rights and fishing rights from hydraulic fracking contaminants and other contaminants that will negatively impact and/or destroy the fishing rights in the river, see, e.g., *United States v. Adair*, 723 F.2d 1394, 1408-1415 (9th Cir. 1983) ("*Adair II*"), cert. denied sub nom, *Oregon v. United States*, 467 U.S. 1252, 104 S. Ct. 3536, 82 L. Ed. 2d 841 (1984). (off-reservation treaty right to fish implied reservation of water to support tribal fisheries); *Dep't of Ecology v. Yakima Reservation Irrigation Dist.*, 850 P.2d 1306, 1317 (Wash. 1993) (Washington Supreme Court recognized that tribes with treaty language . . . reflecting a reservation of aboriginal rights to fish also have water rights for instream flow habitat protection);

- b. A corresponding Winters Doctrine right to maintain the Cheyenne River inhabitable for wildlife, i.e., fishing rights (as well as irrigation) as a beneficial use free from hydraulic fracking contaminants and other contaminants upstream in Converse County that will negatively impact and/or destroy the use of the river for such purpose, see, e.g., *United States v. Alpine Land & Reservoir Co.*, 788 F. Supp. 2d 1209 (D. Nev. 2011) ("the Tribe retains a *Winters* right . . . to water to maintain the fishery"), citing *Nevada v. United States*, 463 U.S. 110 (1983), and

**OST on-reservation Cheyenne River water rights and fishing rights**

WHEREAS, the OST also has existing unextinguished water rights and fishing rights within the Pine Ridge Indian Reservation under the 1851 and 1868 Treaties, including the portion of the Cheyenne River and river bed that abuts the reservation; that Public Law 280, 25 U.S.C. § 1332 (b), defines the scope of the State of Wyoming's civil authority to regulate the OST's water rights and 1851 Treaty fishing rights in the Cheyenne River from Converse County Wyoming to the South Dakota state line as follows:

- (b) Alienation, encumbrance, taxation, and use of property; hunting, trapping or fishing.

Nothing in this section shall authorize the alienation, encumbrance, or taxation of any real or personal property, including water rights, belonging to any Indian tribe . . . that is held in trust by the United States . . . ; or shall

authorize regulation of the use of such property in a manner inconsistent with any Federal treaty . . .; or shall deprive any . . . Indian tribe, band, or community of any right, privilege, or immunity afforded under Federal treaty . . . with respect to. . . fishing or the control, licensing, or regulation thereof, and

WHEREAS, The OST's aboriginal and/or Winters Doctrine water rights in the Cheyenne River includes water rights upstream to Converse County, Wyoming; that the Wyoming State Engineer has no authority to regulate the use of the OST's water rights in the river, or in the ground waters that feed the river, or 1851 Treaty fishing rights that depend on such water right, under 25 U.S.C. § 1332 (b), and

**Trust status of OST water rights**

WHEREAS, the OST's aboriginal waters rights, Winters Doctrine water rights and unextinguished 1851 Treaty fishing rights, are held in trust by the United States for the OST and other 1851 Treaty tribes and are vested property rights that are protected by the Fifth Amendment to the United States Constitution; See generally, Robert T. Anderson, *Indian Water Rights and the Federal Trust Responsibility*, 46 Nat. Resources J. 399 (2006) ("Indian reserved water rights are trust property with legal title held by the United States"); 55 Fed. Reg. 9223 (Mar. 12, 1990) ("Indian water rights are vested property rights for which the United States has a trust responsibility, with the United States holding legal title to such water in trust for the benefit of the Indians"), and

**OST claim to burial sites, human remains, ownership of cultural resources, and access to Sacred Sites in Converse County Wyoming**

WHEREAS, the OST has rights (along with other 1851 Treaty signatory Sioux tribes) to human remains and ownership rights to all Native American cultural resources excavated or discovered on:

1. Federal lands (recognized by a final judgment of the Indian Claims Commission or Court of Claims) in Converse County, Wyoming, under the Native American Graves Protection and Repatriation Act of November 16, 1990 (25 U.S.C. §§ 3001 et seq.) ("NAGPRA"); that the OST's ownership rights to the said cultural resources is supported by a final judgment of the Indian Claims Commission. See *Sioux Tribe v. United States*, 15 Ind. Cl. Comm. 577 (1965) (the 1851 treaty recognized title in the "Sioux or Dahcota Nation" to approximately 60 million acres of territory situated east of the Missouri River in what is now the states of North Dakota, South Dakota, Nebraska, Wyoming, and Montana) and *Sioux Nation v. United States*, 24 Ind. Cl. Comm. 147 (1970) (the "Sioux or Dahcota Nation" with which the United

States negotiated at Fort Laramie and in which title was recognized by the Treaty of September 17, 1851, included the Teton and Yankton divisions of Sioux); and

2. Private lands under the legal principles recognized in *Charrier v. Bell*, 496 So. 2(d) 601 (La. App. 1 Cir. 1986) cert. denied, 498 So. 2d 753 (La. 1986) (Tunica-Biloxi Tribe retained ownership of cultural items discovered on privately held lands) and *Black Hills Inst. of Geological Research v. South Dakota Sch. of Mines*, 12 F.3d 737, 742-744 (8<sup>th</sup> Cir. 1993) (Black Hills III) (Because the [dinosaur] fossil was trust property that was removed from the Indian trust land without the knowledge or consent of the United States, it remained the property of the United States and the attempted sale of the fossil was void and the Institute had no legal right, title, or interest in the fossil as severed from the land), cert. denied, 513 U.S. 810 (1994); that cultural items found on private lands in Converse County remain the trust property of the OST and other 1851 Treaty Sioux Tribes, and were not conveyed to the present non-Indian occupants under the Homestead Act or otherwise, and the United States and its agencies, i.e., BLM and F&WLS, continue to have a fiduciary duty to protect them to the same extent as they had a duty to protect the fossil in the *Black Hills Inst. Of Geological Research v. South Dakota School of Mines* case cited above, and

WHEREAS, the U.S. Department of Interior and its agencies, including the BLM and F&WLS are hereby put on notice that the OST claims (along with other 1851 Treaty signatory Sioux tribes) all Native American burial sites and human remains, and an ownership interest in all cultural items, associated funerary objects, unassociated funerary objects, sacred objects, cultural patrimony, including stone features, i.e., stone rings, stone effigies, stone alignments, and rock cairns located on federally held lands in Converse County under NAGPRA, and a right of access to sacred sites located on federally held lands within Converse County, under the American Indian Religious Freedom Act ("AIRFA"), 42 U.S.C. § 1996, and

WHEREAS, the U.S. Department of Interior and its agencies are further put on notice that the OST claims (along with other 1851 Treaty signatory Sioux tribes) all Native American burial sites and human remains, and an ownership interest in all cultural items, associated funerary objects, unassociated funerary objects, sacred objects, cultural patrimony, including stone features, i.e., stone rings, stone effigies, stone alignments, and rock cairns located on privately held lands in Converse County under the legal principles recognized in the *Charrier v. Bell* and *Black Hills Inst. of Geological Research v. South Dakota School of Mines* cases cited above, and that the OST regards such

items located on privately held lands to be its trust property for which the United States and its agencies have a fiduciary duty to protect, and

**Necessity for water quality to protect OST  
off-reservation and on-reservation water and fishing rights**

WHEREAS, the Draft EIS indicates that five oil and gas developers, i.e., Anadarko Petroleum Company, Chesapeake Energy Corporation, Devon Energy, EOG Resources, Inc., and SM Energy, have proposed (under Preferred Alternative "B") to develop 5,000 oil wells on 1,500 new well pads, plus an additional 455 pads for production, for water source wells and for water disposal wells on 1.5 million acres in Converse County, all of which will directly and negatively impact the air quality, water quality, cultural resources, and tribal off-reservation and on-reservation water rights and fishing rights; that water quantity and quality (free from hydraulic fracking) is essential to maintain the Tribe's 1851 Treaty fishing rights in rivers and streams in the 1851 Treaty territory as well as fishing rights, irrigation rights, and other beneficial uses, in the Cheyenne River which originates in Converse County and abuts the Pine Ridge Indian Reservation downstream. See, e.g., *Hopi Tribe v. U.S.*, 782 F.3d 662, 669 (Fed. Cir. 2015) (In some circumstances, [the Winters Doctrine] may also give the United States the power to enjoin others from practices that reduce the quality of water feeding the reservation); Judith V. Royster, *Water Quality And The Winters Doctrine*, 107 *Water Resources Update* 50 (1997), <http://opensiuc.lib.siu.edu/cgi/viewcontent.cgi?article=1291&context=jcwre> (A tribe may receive the quantity of water called for under its Winters rights, but the quality of the water may make it unusable for the purposes for which it was intended . . . \* \* \* If the water provided at the reservation border is so degraded that it cannot be used for irrigation, then the water right is essentially meaningless), and

**Rights to Government-to-Government and  
NHPA Section 106 consultations under federal and tribal law**

WHEREAS, neither the BLM nor the F&WLS have engaged in government-to-government consultations with the Oglala Sioux Tribe on the Draft EIS in the manner required by federal and tribal law as follows:

1. Congress, through the 1992 amendments to the National Historic Preservation Act of 1966 ("NHPA"), passed Section 101 (d) (2) (A) that established *Tribal Historic Preservation Officers* (THPOs) on reservations to assume State Historic Preservation Officers (SHPOs) responsibilities within federally recognized reservation boundaries; and to provide THPOs authority to "regulate" Federal undertakings through consultation on any Section 106 activity within their respective reservation boundaries on tribal lands.

2. The main purpose of the 1992 amendments to NHPA was lobbied by the leadership of tribal governments to allow *Indian Tribes* to identify areas and places, cultural resources and sacred areas significant to the Indian Tribe's heritage and cultural identity with Congress; this process was the foundation to require government-to-government consultation with said Indian Tribes outside reservation boundaries.

3. Because of these lobbying efforts, Congress also amended the NHPA in 1992 creating a new section in the act (referenced in 36 CFR 800.2 (c) (ii) which stated in part that:

*"Section 101 (d) (6) (B) of the act requires the agency official to consult with any Indian tribe . . . that attaches religious and cultural significance to historic properties that may be affected by an undertaking. This requirement applies regardless of the location of the historic property."*

4. 36 CFR 800.2 (c) (ii) (C) of the NHPA created the government-to-government consultation requirement with Indian tribes as follows:

*Consultation with an Indian tribe must recognize the government-to-government relationship between the Federal Government and Indian tribes. The agency official shall consult with representatives designated or identified by the tribal government . . . . Consultation with Indian tribes ...should be conducted in a manner sensitive to the concerns and needs of the Indian tribe. The Indian tribe has to designate or identify by resolution the official tribal governmental leader(s) to consult with Federal and non-federal agencies, individuals or private industry outside reservation boundaries when that respective tribal government attaches religious and cultural significance to historic properties to areas or resources significant to them.*

5. On November 6, 2000, President Clinton issued Executive Order 13175, which required federal departments and agencies to consult with Indian tribal governments when considering policies that would impact tribal communities and reiterated the federal government's previously acknowledged commitment to tribal self-government and limited autonomy; that President Obama thereafter issued a Memorandum issued on November 5, 2009 to fully implement Executive Order 13175; and that Executive Order No. 13175 is applicable to the OST's request for the government-to-government consultations on the Draft EIS for the Converse County Oil and Gas Project.

6. In 2011, the Oglala Sioux Tribal Council passed Ordinance No. 11-10 which defined the procedures that federal agencies must comply with to constitute a NHPA Section 106 consultation or a government-to-government consultation with the OST; that Section 7.a. of Ordinance No. 11-10 provides that all consultations between the OST and federal agencies must "*occur through a formal meeting with the Oglala Sioux Tribal Council,*" and

WHEREAS, the Oglala Sioux Tribal Council has never been consulted with by BLM or F&WLS on the Draft EIS under NHPA Section 106, or under Executive Order No. 13175 as implemented by President Osama's November 5, 2009 memorandum, or under Oglala Sioux Tribal Council Ordinance No. 11-10, and

WHEREAS, the BLM and F&WLS are hereby put on notice that the meeting between the BLM and THPOs that was held at the BLM office at Casper, Wyoming on February 20-21, 2018, did not constitute a NHPA Section 106 consultation, an Executive Order 13175 government-to-government consultation or a OST Tribal Council Ordinance No. 11-10 consultation, between the BLM and the OST on the Draft EIS, and

WHEREAS, official consultations on the Draft EIS must still be held between BLM, the F&WLS and the Oglala Sioux Tribal Council to comply with NHPA Section 106 and Oglala Sioux Tribal Council Ordinance No. 11-10.

**Lack of NEPA Public Scoping Meetings on  
Pine Ridge Indian Reservation on Draft EIS**

WHEREAS, neither BLM or F&WLS have held any NEPA scoping meetings on the Pine Ridge Indian Reservation and surrounding non-Indian communities that will be impacted by the Draft EIS for the Converse County Oil and Gas Project, as required by 43 CFR §§ 46.235 (a) and 46.235 (b), and

**Protection of tribal water right, fishing rights,  
cultural resources and Sacred Sites under UNDRIP**

WHEREAS, the also OST also notes, and brings to BLM's attention, the following articles contained in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), adopted by the General Assembly on Thursday, 13 September 2007, and supported by the December 6, 2010, declaration of President Obama:

Article 11: Indigenous peoples have the right to practice and revitalize their cultural traditions and customs. This includes the right to maintain, protect and develop the past, present and future manifestations of their cultures, such as archaeological and historical sites . . . .

Article 12: Indigenous peoples have the right to manifest, practice, develop and teach their spiritual and religious traditions, customs and ceremonies; the right to maintain, protect, and have access in privacy to their religious and cultural sites; the right to the use and control of their ceremonial objects; and the right to the repatriation of their human remains. 2. States shall seek to enable the access and/or repatriation of ceremonial objects and human remains in their possession through fair, transparent and effective mechanisms developed in conjunction with indigenous peoples concerned.

Article 19: States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing . . . administrative measures that may affect them.

Article 25: Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters . . . and other resources and to uphold their responsibilities to future generations in this regard.

Article 29: Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources.

Article 32: States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources; now

THEREFORE BE IT RESOLVED, that the OST hereby petitions and requests BLM (through Mike Robinson, Planning and Environmental Coordinator/Project Manager of the Casper Field Office) and the F&WLS to enter into NHPA Section 106, Executive Order No. 13175 and Oglala Sioux Tribal Ordinance No. 11-10 consultations with the Oglala Sioux Tribal Council on the Draft EIS for the Converse County Oil and Gas Project for the aforesaid reasons, and for other reasons to be brought up and discussed and resolved during the consultations, and

BE IT FURTHER RESOLVED, the consultations with the BLM and F&WLS requested in this resolution (on the Draft EIS for the Converse County Oil and Gas Project) shall be held at Prairie Wind Casino/Hotel

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Conference Room on the Pine Ridge Indian Reservation on April 17-18, 2018, and

BE IT FURTHER RESOLVED, that Mike Robinson is hereby directed (as trustee of the OST) to personally participate in the consultations, and to notify the appropriate officials of the F&WLS of the Tribe's request for them to participate in the consultations requested in this resolution, and

BE IT FURTHER RESOLVED, that because of concerns among tribal members about the adverse impacts caused, or will be caused, from natural gas flaring and hydraulic fracking from the Converse County, Wyoming Oil and Gas Project (which is located approximately 100 miles due west of the Pine Ridge Indian Reservation) on tribal water rights, fishing rights, NAGPRA rights, and on the health, economy and general welfare of the OST and its members, the Tribal President and all Council and Executive Committee members are requested to attend the consultations on the Draft EIS for the Project, and

BE IT FURTHER RESOLVED, that the Tribal President shall send a copy of this Resolution and a copy of Oglala Sioux Tribal Council Ordinance No. 11-10 to Mike Robinson by certified mail, return receipt request, and by fax, as required by Section 7. a. of Ordinance No. 11-10, and

BE IT FURTHER RESOLVED, that the Tribal President shall invite the following Tribes to attend the consultations: (a) Cheyenne River Sioux Tribe, (b) Crow Creek Sioux Tribe, (c) Flandreau Sioux Tribe, (d) Fort Peck Sioux Tribe, (e) Lower Brule Sioux Tribe, (f) Rosebud Sioux Tribe, (g) Santee Sioux Tribe, (h) Sisseton-Wahpeton Oyate, (i) Standing Rock Sioux Tribe, (j) Yankton Sioux Tribe, and (k) the Eastern Shoshone and Arapahoe Tribes of Wyoming, and

BE IT FURTHER RESOLVED, that the Tribal President shall request that the Standing Rock Sioux Tribe authorize cultural resources expert Tim Mentz to make a presentation on the Draft EIS for the Converse County Oil and Gas Project at the consultations meeting., and

BE IT FURTHER RESOLVED, that the Tribal President shall direct the OST THPO to attend the consultations and make a report on the status of the THPO's involvement on the Draft EIS for the Converse County Oil and Gas Project, and

BE IT FURTHER RESOLVED, that the Tribal President shall invite Mary Hopkins, the Wyoming State Historic Preservation Officer (SHPO), to attend the consultations and make a report on the status of the State's involvement in the Draft EIS for the Converse County Oil and Gas Project and to Lisa Lindemann, Wyoming State Engineer's Office, to report on the number of state ground water permits that have been issued for the Oil


and Gas Project, and to which oil and gas companies they were issued,  
and

BE IT FURTHER RESOLVED, that the Tribal Secretary and Fifth Member  
shall be responsible for:


1. Arranging for a meeting room at the Prairie Wind Casino for the consultations between the BLM, F&WLS, and the Tribal Council;
2. Establishing an agenda for the consultations;
3. Arranging for a moderator to chair the consultations;
4. Arranging for discounts at the Prairie Wind Casino Hotel for tribal representatives attending the consultations;
5. Arranging for refreshments for participants attending the consultations, and
6. Arranging for a Power Point/overhead projectors and a PA System for speakers for the consultations.

C-E-R-T-I-F-I-C-A-T-I-O-N

I, as the undersigned Secretary of the Executive Committee of the Oglala Sioux Tribe, do hereby certify that this Resolution was adopted by a vote of: 4 For; 0 Against; 0 Abstaining; 0 Not Voting during a REGULAR SESSION held on the 21ST day of MARCH, 2018.

  
DONNA M. SALOMON  
Secretary  
Oglala Sioux Tribe

A-T-T-E-S-T:

  
TROY S. WESTON  
President  
Oglala Sioux Tribe



## Appendix C

## STATEMENT OF BASIS

**Applicant:** City of Edgemont  
**Permit Number:** SD0023701  
**Contact Person:** Jerry Dibble, Mayor  
PO Box A  
Edgemont, SD 57735  
**Phone:** (605) 662-7422  
**Permit Type:** Minor Municipal - Renewal

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This document is intended to explain the basis for the requirements contained in the draft Surface Water Discharge Permit. This document provides guidance to aid in complying with the permit requirements. This guidance is not a substitute for reading the draft permit and understanding its requirements.

### DESCRIPTION

The city of Edgemont operates a wastewater treatment facility located about ½ mile east of the city in the North ½ of Section 6, Township 9 South, Range 3 East, in Fall River County, South Dakota (Latitude 43.302222°, Longitude -103.807889°, Navigational Quality GPS).

Wastewater flows by gravity to a main lift station, which pumps wastewater to a three cell stabilization system. The wastewater is pumped from the lift station to Cell 1 (20 acres in size) followed by Cell 2 (10 acres) and Cell 3 (7.5 acres). The stabilization cells are normally operated in series, but influent can be diverted to Cell 2. Discharges are valve controlled from Cell 3 through a weir box into the Cheyenne River.


The original wastewater treatment facility was built in 1957 and was upgraded to the existing three cell stabilization system in 1988. According to the permit application, the average design flow of the facility is 0.3 million gallons per day (MGD). This wastewater treatment facility serves a population of 785 persons (permit application), with no known industrial users contributing flow to the system.

### RECEIVING WATERS

Any discharge from this facility will enter the Cheyenne River which is classified by the South Dakota Surface Water Quality Standards (SDSWQS), Administrative Rules of South Dakota (ARSD), Sections 74:51:03:01 and 74:51:03:08, for the following beneficial uses:

- (5) Warmwater semipermanent fish life propagation waters;
- (8) Limited contact recreation waters;
- (9) Fish and wildlife propagation, recreation, and stock watering waters; and
- (10) Irrigation waters.

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## Appendix C

Statement of Basis for City of Edgemont draft Surface Water Discharge Permit for the wastewater treatment facility.

## **TOTAL MAXIMUM DAILY LOAD**

Section 303(d) of the federal Clean Water Act requires states to develop Total Maximum Daily Loads (TMDLs) for waters at levels necessary to achieve and maintain water quality standards. TMDLs are calculations of the amount of pollution a waterbody can receive and still maintain applicable water quality standards. TMDLs are necessary for waters that do not meet or are not expected to meet water quality standards with the application of technology-based controls for point sources. TMDLs address specific waterbodies, segments of waterbodies, or even entire watersheds, and are pollutant specific. TMDLs must allow for seasonal variations and a margin of safety, which accounts for any lack of knowledge concerning the relationship between pollutant loads and water quality.

The Cheyenne River from the Wyoming border to Beaver Creek has been identified as being impaired for Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Sodium Absorption Ratio (SAR), and Conductivity but a TMDL has not been completed yet and no wasteload allocation has been assigned to the city of Edgemont's wastewater treatment facility. The permit will be reopened, if necessary, to address the facility's wasteload allocation once the TMDL is completed.

## **ANTIDEGRADATION**

SDDENR has fulfilled the antidegradation review requirements for this permit. In accordance with South Dakota's Antidegradation Implementation Procedure and the SDSWQS, no further review is required. The results of SDDENR's review are included in Attachment 1.

## **MONITORING DATA**


The city of Edgemont has been submitting Discharge Monitoring Reports (DMRs) as required under the current permit. As shown in Attachment 2, this facility has had one 30-Day Average and one Daily Maximum violation of ammonia, one daily minimum of pH, and one daily maximum violation of pH during the current permit cycle. However, these violations seem to be isolated incidences and do not reflect the overall treatment performance of this facility. No future violations are expected. No discharge was reported for the months not included in the table.

## **INSPECTIONS**

Personnel from SDDENR conducted a *Compliance Inspection* of the city of Edgemont's wastewater treatment facility on September 10, 2015. The following comments and corrective actions were required in order to come into compliance with the city's Surface Water Discharge (SWD) permit:

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past violations and corrective actions

| COMMENTS  | REQUIRED CORRECTIVE ACTIONS  |
|---|--|
| <p>There is no flow measuring device at the wastewater treatment facility. The city currently determines flow by calculating pond drawdown during a discharge; however, there are no pond depth indicators in the ponds, so the flow calculations are an estimate.</p> <p><b>This comment was made in previous inspections.</b></p> | <p>The city is required to report flow rate on its DMRs as a condition of the SWD permit. To ensure accurate reporting of flow, the city must install a flow measurement device.</p>   |
| <p>There are no pond depth indicators in Cells 1, 2, and 3.</p>   | <p>A pond depth indicator should be installed in each pond. The operator should record the ponds during each inspection. These records will be helpful in determining flows to and from the ponds and aid in maintaining the proper operating depths in the ponds at all times.</p> <p>The pond depth indicators can also be used as the effluent flow measurement device. Please note, discharge flow measurement is a requirement of the SWD permit.</p> |

## EFFLUENT LIMITS

**Outfall 001** – Any discharge from Cell 3 weir box to the Cheyenne River (Latitude 43.304056°, Longitude -103.807833°, Navigational Quality GPS).

**No discharge shall occur from this facility until permission is granted by SDDENR. The permittee shall comply with the effluent limits specified below.** This requirement is included in the permit because the discharge reaches a stream classified as a fishery. During any discharge, the permittee shall comply with the effluent limits specified below which are based on the Secondary Treatment Standards (ARSD Section 74:52:06:03), the SDSWQS, permit writer's judgment, and the current permit limits.

1. The Five-Day Biochemical Oxygen Demand (BOD<sub>5</sub>) concentration shall not exceed 30 mg/L (30-day average) or 45 mg/L (7-day average). These limits are based on the Secondary Treatment Standards and are being included because SDDENR has determined there is a reasonable potential for BOD<sub>5</sub> to be present in the discharge at levels that may violate the SDSWQS.
2. The Total Suspended Solids (TSS) concentration shall not exceed 90 mg/L (30-day average) or 135 mg/L (7-day average). These limits are based on Secondary Treatment Standards, the warmwater semipermanent fish life propagation waters classification of

the Cheyenne River, and the variance granted to the city during the current permit term and are being included because SDDENR has determined there is a reasonable potential for TSS to be present in the discharge at levels that may violate the SDSWQS.

**Note:** ARSD Section 74:52:06:04(2) allows TSS limits less stringent than Secondary Treatment Standards if it can be demonstrated that:

- a) Waste stabilization ponds are the principal process used for secondary treatment;
- b) Operation and maintenance data indicate that TSS values specified in subdivision 74:52:06:03(3) cannot be achieved;
- c) The effluent quality for TSS does not exceed 110 mg/L for 30-day average and 165 mg/L for 7-day average; and
- d) The POTW is achieving levels of effluent quality required for BOD<sub>5</sub> specified in Section 74:52:06:03.

Because the facility meets the above criteria, the TSS variance is allowed and will be continued in the draft permit. However, since the Cheyenne River is classified as a warmwater semipermanent fishery, the TSS limits will be 90 mg/L (30-day average) and 135 mg/L (7-day average) to ensure the discharge does not impair the beneficial uses of the Cheyenne River, in accordance with SDDENR's policy.

3. The pH shall not be less than 6.5 standard units or greater than 9.0 standard units in any single analysis and/or measurement. These limits are based on the warmwater semipermanent classification of the Cheyenne River and the Secondary Treatment Standards and are being included because SDDENR has determined there is a reasonable potential for the pH of the effluent to violate the SDSWQS. The minimum pH required under the Secondary Treatment Standards is 6.0 standard units; the minimum pH required by the beneficial uses assigned to the Cheyenne River is 6.5 standard units. Therefore, the more stringent limit of 6.5 standard units shall be applied to this discharge to ensure compliance with both the Secondary Treatment Standards and the SDSWQS.

**Note:** SDDENR specifies that pH analyses are to be conducted within 15 minutes of sample collection with a pH meter. Therefore, the permittee must have the ability to conduct onsite pH analyses. The pH meter used must be capable of simultaneous calibration to two points on the pH scale that bracket the expected pH and are approximately three standard units apart. The pH meter must read to 0.01 standard units and be equipped with temperature compensation adjustment. Readings shall be reported to the nearest 0.1 standard units.

4. The *Escherichia coli* (*E. coli*) organisms shall not exceed a concentration of 630 per 100 milliliters as a geometric mean based on a minimum of five samples obtained during separate 24-hour periods for any calendar month. *This limit is only applicable if five or more samples are taken and is only effective from May 1 to September 30.*

In addition, the *E. coli* organisms shall not exceed 1,178 per 100 milliliters in any one sample from May 1 to September 30. These limits are based on the limited-contact recreation beneficial use classification of the Cheyenne River and the SDSWQS (ARSD Section 74:51:01:51) and are being included because SDDENR has determined there is a reasonable potential for *E. coli* to be present in the discharge at levels that may violate the SDSWQS.

5. The ammonia-nitrogen (as N) concentration shall not exceed the limits specified in the table below. These limits are based on the warmwater semipermanent fish life propagation waters classification of the Cheyenne River, the SDSWQS (ARSD Section 74:51:01:48), the current permit limits, and permit writer's professional judgment and are being included because SDDENR has determined there is a reasonable potential for ammonia-nitrogen to be present in the discharge at levels that may violate the SDSWQS. See Attachment 3 for more detail.

| Month                      | Ammonia Limit (as N)     |                         |
|----------------------------|--------------------------|-------------------------|
|                            | 30-Day Average<br>(mg/L) | Daily Maximum<br>(mg/L) |
| January 1 – January 31     | 6.2                      | 13.9                    |
| February 1 – February 29   | 6.2                      | 12.4                    |
| March 1 – March 31         | 1.6                      | 2.9                     |
| April 1 – April 30         | 1.6                      | 2.9                     |
| May 1 – May 31             | 1.6                      | 2.9                     |
| June 1 – June 30           | 1.0                      | 1.5                     |
| July 1 – July 31           | 1.0                      | 1.5                     |
| August 1 – August 31       | 1.0                      | 1.5                     |
| September 1 – September 30 | 1.5                      | 2.7                     |
| October 1 – October 31     | 1.5                      | 2.7                     |
| November 1 – November 30   | 3.9                      | 7.8                     |
| December 1 – December 31   | 5.4                      | 11.5                    |

6. No chemicals, such as chlorine, shall be used without prior written permission. This limit is based on permit writer's professional judgment.

SDDENR does not believe there is a reasonable potential for other pollutants to violate the SDSWQS. The limits and monitoring in the draft permit will be sufficient to ensure the protection of the water quality near the city of Edgemont's wastewater treatment facility's discharge.

## SELF MONITORING REQUIREMENTS

Prior to requesting permission to discharge, the permittee shall collect a grab sample from each lagoon cell that will be discharged and have the sample analyzed for BOD<sub>5</sub>, TSS, pH, water temperature, *E. coli*, and ammonia-nitrogen (as N). The results of the analyses, along with a request to discharge, shall be submitted to SDDENR. The request to discharge shall explain why a discharge is needed, when the discharge would start, the expected duration of the discharge,

and the approximate volume of water to be discharged. The estimated flow condition of the receiving water shall also be reported (i.e. dry, low, normal, high). **No discharge shall occur until permission has been granted by SDDENR.**

The draft permit requires the permittee to monitor all discharges for BOD<sub>5</sub> (mg/L), TSS (mg/L), pH (su), ammonia-nitrogen (as N, mg/L), and *E. coli* (#/100mL). These monitoring requirements are based on the limits in the draft permit for these parameters. Effluent water temperature (°C), total flow (million gallons), flow rate (MGD), and duration of discharge (days) shall be monitored, but will not have a limit. These monitoring requirements are based on the need to fully characterize the discharge.

If a single, continuous discharge's duration is less than or equal to three days, the permittee shall take one sample per day. For a single, continuous discharge that is greater than three days and less than or equal to seven days, three samples shall be taken during the discharge. For discharges greater than seven days, three samples shall be taken during the first seven days of the discharge and then one sample shall be taken per week of discharge after that. All of the samples collected during the 7-day or 30-day period are to be used in determining the averages. The permittee always has the option of collecting additional samples if appropriate.

The city of Edgemont was approved to electronically submit DMRs through NetDMR on October 5, 2012. Effluent monitoring results shall be summarized for each month and recorded on a DMR to be submitted via NetDMR to SDDENR on a **monthly** basis. If no discharge occurs during a month, it shall be stated as such on the DMR.

On October 22, 2015, the Environmental Protection Agency (EPA) published in the federal register a rule that makes electronic reporting of permit reporting requirements mandatory for all SWD permits. Phase 1 of the rule requires that all DMRs must be submitted electronically as of December 21, 2016. Currently, SDDENR is approved to accept DMRs electronically via NetDMR. EPA's rule will require all permit reporting requirements (such as permit applications and violation reports) to be submitted electronically. SDDENR is working on programs to meet this requirement and will notify facilities as they become available.

Monitoring shall consist of **monthly** inspections of the facility and the outfall to verify that proper operation and maintenance procedures are being practiced and whether or not there is a discharge occurring from this facility. **Daily** inspections are required during a discharge. The lift station shall be inspected on at least a **weekly** basis, although **daily** inspections are recommended. During any sanitary overflow, the lift stations shall be inspected on a **daily** basis. Documentation of each of these visits shall be kept in a notebook to be reviewed by SDDENR or EPA personnel when an inspection occurs.

## **WHOLE EFFLUENT TOXICITY**

The SDDENR *Reasonable Potential Implementation Procedure for SWD Permits* was reviewed to determine if Whole Effluent Toxicity (WET) testing is applicable to the city of Edgemont. Following the guidance document, the city of Edgemont is not believed to have reasonable potential to cause or contribute to an exceedance of the SDSWQS for toxicity.

The draft permit will not include WET monitoring or limits. SDDENR has determined that due to the facility's minor discharge status and the lack of significant industrial contributions to the wastewater treatment facility there is no reasonable potential for WET. SDDENR has the authority to reopen the permit to add WET effluent limits, compliance schedules, monitoring, or other appropriate requirements.

## **PRETREATMENT**

The city of Edgemont has a design flow of less than 5.0 MGD, and no industries who are likely to cause pass through or interference with the POTW. Therefore, the draft permit will not require the city of Edgemont to develop an industrial pretreatment program. Any categorical industrial user (CIU) or significant industrial user (SIU) that discharges to the POTW will be permitted by the state. However, the city must still meet the requirements for regulating nondomestic sources of wastewater entering its system in accordance with the requirements of section 6.0 of the draft permit.

## **SLUDGE**

Based on the city of Edgemont's permit application, SDDENR does not anticipate sludge will be removed or disposed of during the life of the permit. Therefore, the draft Surface Water Discharge permit shall not contain sludge disposal requirements. However, if sludge disposal is necessary, the city of Edgemont is required to submit to SDDENR a sludge disposal plan for review

## **DRAINAGE ISSUES**

Fall River County has the authority to regulate drainage. The city of Edgemont is responsible for getting any necessary drainage permits from the county **prior** to discharging.

## **ENDANGERED SPECIES**

This is a renewal of an existing permit. No listed endangered species are expected to be impacted by activities related to this permit. According to the US Fish and Wildlife Service, no endangered species were expected to be found in Fall River County.

This information was accessible at the following US Fish and Wildlife Service website as of December 7, 2018, and was last updated by the US Fish and Wildlife Service January 11, 2017: [https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty\\_Jan2017.pdf](https://www.fws.gov/southdakotafieldoffice/SpeciesByCounty_Jan2017.pdf).

## **PERMIT EXPIRATION**

A five-year permit is recommended.

## **PERMIT CONTACT**

This statement of basis and the draft permit were developed by Tina McFarling, P.E., Engineer III for the Surface Water Quality Program. Any questions pertaining to this statement of basis or the draft permit can be directed to the Surface Water Quality Program, at (605) 773-3351.

December 7, 2018

# **ATTACHMENT 1**

## **Antidegradation Review**

**Minor Municipal**

Permit Type: **- Renewal** Applicant: **City of Edgemont**  
Date Received: **October 3, 2013** Permit #: **SD0023701**  
County: **Fall River** Legal Description: **N ½ of Sec. 6, T9S, R3E**  
Receiving Stream: **Cheyenne River** Classification: **5, 8, 9, 10**  
If the discharge affects a downstream waterbody with a higher use classification, list its name and uses:

---

**APPLICABILITY**

1. Is the permit or the stream segment exempt from the antidegradation review process under ARSD 74:51:01? Yes ☒ No ☐ If no, go to question #2. If yes, check those reasons why the review is not required:

- ☐ Existing facility covered under a surface water discharge permit is operating at or below design flows and pollutant loadings;
- ☐ \*Existing effluent quality from a surface water discharge permitted facility is in compliance with all discharge permit limits;
- ☐ \*Existing surface water discharge permittee was discharging to the current stream segment prior to March 27, 1973, and the quality and quantity of the discharge has not degraded the water quality of that segment as it existed on March 27, 1973;
- ☐ \*The existing surface water discharge permittee, with DENR approval, has upgraded or built new wastewater treatment facilities between March 27, 1973, and July 1, 1988;
- ☐ The existing surface water discharge permittee discharges to a receiving water assigned only the beneficial uses of (9) and (10); the discharge is not expected to contain toxic pollutants in concentrations that may cause an impact to the receiving stream; and DENR has documented that the stream cannot attain a higher use classification. This exemption does not apply to discharges that may cause impacts to downstream segments that are of higher quality;
- ☐ Receiving water meets Tier 1 waters criteria. Any permitted discharge must meet water quality standards;
- ☐ The permitted discharge will be authorized by a Section 404 Corps of Engineers Permit, will undergo a similar review process in the issuance of that permit, and will be issued a 401 certification by the department, indicating compliance with the state's antidegradation provisions; or
- ☒ Other: This permit does not authorize an increase in effluent limits.

\*An antidegradation review is not required where the proposal is to maintain or improve the existing effluent levels and conditions. Proposals for increased effluent levels, in these categories of activities are subject to review.

**No further review required.**

## **ANTIDEGRADATION REVIEW SUMMARY**

2. The outcome of the review is:
- ☒ A formal antidegradation review was not required for reasons stated in this worksheet. Any permitted discharge must ensure water quality standards will not be violated.
  - ☐ The review has determined that degradation of water quality should not be allowed. Any permitted discharge would have to meet effluent limits or conditions that would not result in any degradation estimated through appropriate modeling techniques based on ambient water quality in the receiving stream, or pursue an alternative to discharging to the waterbody.
  - ☐ The review has determined that the discharge will cause an insignificant change in water quality in the receiving stream. The appropriate agency may proceed with permit issuance with the appropriate conditions to ensure water quality standards are met.
  - ☐ The review has determined, with public input, that the permitted discharge is allowed to discharge effluent at concentrations determined through a total maximum daily load (TMDL). The TMDL will determine the appropriate effluent limits based on the upstream ambient water quality and the water quality standard(s) of the receiving stream.
  - ☐ The review has determined that the discharge is allowed. However, the full assimilative capacity of the receiving stream cannot be used in developing the permit effluent limits or conditions. In this case, a TMDL must be completed based on the upstream ambient water quality and the assimilative capacity allowed by the antidegradation review.
  - ☐ Other: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. Describe any other requirements to implement antidegradation or any special conditions That are required as a result of this antidegradation review: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Tina McFarling  
Reviewer

December 7, 2018  
Date

Albert Spangler  
Team Leader

December 7, 2018  
Date

# **ATTACHMENT 2**

## **Monitoring Data**

The monitoring data was obtained from the facility's DMRs and retrieved through the ICIS database, accessed December 5, 2018. The period of the data is from **April 1, 2009 to November 30, 2018**. Public access to the facility's monitoring data is available at EPA's Enforcement and Compliance History Online (ECHO) website: <https://echo.epa.gov/>

|               | BOD <sub>5</sub> |                | Fecal Coliform  |              | Duration of discharge | Flow rate   |           | Total Flow          |
|---------------|------------------|----------------|-----------------|--------------|-----------------------|-------------|-----------|---------------------|
|               | 30 Day Avg.      | Max 7 Day Avg. | 30 Day Geo Mean | Daily Max    |                       | 30 Day Avg. | Daily Max |                     |
| Limit         | 30 mg/L          | 45 mg/L        | 1000 #/100mL    | 2000 #/100mL | Monthly Total         | N/A MGD     | N/A MGD   | N/A Million Gallons |
| DMR           |                  |                |                 |              |                       |             |           |                     |
| February 2010 | 10               | 13             | NR              | NR           | 15                    | 1.29        | 1.29      | 19.35               |
| February 2011 | 7                | 18             | NR              | NR           | 20                    | 1.88        | 1.88      | 58                  |
| February 2012 | 15.4             | 17             | NR              | NR           | 20                    | 1.88        | 1.89      | 37.6                |
| February 2013 | 5.5              | 8              | NR              | NR           | 28                    | 1.87        | 1.89      | 56.7                |
| March 2014    | 4                | 4              | NR              | NR           | 14                    | 0.28        | 0.28      | 4.04                |
| April 2014    | 5                | 5              | NR              | NR           | 1                     | 0.1         | 0.1       | 0.1                 |
| February 2015 | 5                | 11             | NR              | NR           | 25                    | 0.29        | 0.29      | 7.25                |
| March 2015    | 14               | 16             | NR              | NR           | 25                    | 0.29        | 0.29      | 7.78                |
| January 2016  | 12.54            | 35             | NR              | NR           | 20                    | 0.72        | 0.72      | 14.4                |
| February 2016 | 8.9              | 15             | NR              | NR           | 29                    | 0.72        | 0.72      | 20.88               |
| March 2016    | 13               | 13             | NR              | NR           | 4                     | 0.72        | 0.72      | 2.88                |
| April 2017    | 7.36             | 8.7            | NR              | NR           | 14                    | 0.72        | 10.08*    | 10.08               |

|               | Ammonia     |             | pH        |           | TSS         |                | Temperature |           |
|---------------|-------------|-------------|-----------|-----------|-------------|----------------|-------------|-----------|
|               | 30 Day Avg. | Daily Max   | Daily Min | Daily Max | 30 Day Avg. | Max 7 Day Avg. | 30 Day Avg. | Daily Max |
| Limit         | Varies mg/L | Varies mg/L | 6.5 SU    | 9 SU      | 90 mg/L     | 135 mg/L       | N/A °C      | N/A °C    |
| DMR           |             |             |           |           |             |                |             |           |
| February 2010 | 3.2         | 4           | 7.32      | 7.55      | 5.25        | 9              | 1.6         | 1.6       |
| February 2011 | 2.7         | 6.5         | 7.44      | 8.24      | 3           | 5              | 12.9        | 15.8      |
| February 2012 | 2.34        | 3.2         | 7.16      | 8.03      | 20.4        | 23.67          | 3.34        | 4.3       |
| February 2013 | 1.99        | 3.6         | 7.56      | 8.08      | 6.2         | 19             | 8.32        | 9.6       |

|               | Ammonia     |             | pH        |           | TSS         |                | Temperature |           |
|---------------|-------------|-------------|-----------|-----------|-------------|----------------|-------------|-----------|
|               | 30 Day Avg. | Daily Max   | Daily Min | Daily Max | 30 Day Avg. | Max 7 Day Avg. | 30 Day Avg. | Daily Max |
| DMR           | Varies mg/L | Varies mg/L | 6.5 SU    | 9 SU      | 90 mg/L     | 135 mg/L       | N/A °C      | N/A °C    |
| Limit         |             |             |           |           |             |                |             |           |
| March 2014    | 0.27        | 0.56        | 7.8       | 8         | BD          | BD             | 11          | 13        |
| April 2014    | 0.4         | 0.4         | 7.4       | 7.4       | BD          | BD             | 5.8         | 5.8       |
| February 2015 | 0.06        | 0.06        | 6.2       | 7.5       | 11          | 17             | 5           | 8         |
| March 2015    | 0.5         | 0.05        | 9.36      | 9.57      | 46          | 65             | 8           | 10        |
| January 2016  | 1.14        | 2.67        | 7.78      | 8.26      | 34.76       | 89             | 3.6         | 5.6       |
| February 2016 | 3.13        | 3.77        | 7.76      | 8.33      | 7.5         | 10             | 6.27        | 11        |
| March 2016    | 3.3         | 3.3         | 9         | 9         | 13.6        | 13.6           | 9.4         | 9.4       |
| April 2017    | 0.3         | 1.28        | 8.3       | 8.94      | 12.56       | 18.4           | 15.06       | 17.1      |

\* Daily Maximum Flow Rate is inconsistent with other data provided. It appears that the Total Flow was reported instead of the Daily Maximum Flow Rate

BD is Below Detection. Pollutant concentrations were too small to be measured.

NR is Not Required. No sample was required for this parameter during the monitoring period.

Violations are bolded, shaded, and larger font.

# **ATTACHMENT 3**

**Ammonia Limits Development  
for the  
City of Edgemont Treatment Facility  
  
in the Cheyenne River  
near  
Edgemont, South Dakota**

**Prepared by  
  
South Dakota Department of Environment and Natural Resources  
  
2018**

## INTRODUCTION

Under Section 303(c) of the federal Clean Water Act, states have been required to develop water quality standards to protect public health and enhance water quality. In accordance with the Clean Water Act, the state of South Dakota has assigned beneficial uses to all waters of the state and developed water quality criteria to protect those uses. South Dakota's surface water quality standards and assigned beneficial uses are found in the Administrative Rules of South Dakota (ARSD) Article 74:51.

To ensure the protection of the state's surface water quality standards, the Clean Water Act authorized a permitting program for point source discharges of pollutants. The U.S. Environmental Protection Agency delegated this permitting program to the South Dakota Department of Environment and Natural Resources on December 30, 1993.

The department issues Surface Water Discharge permits containing, at a minimum, technology-based effluent limits. However, these limits are not always adequate to protect South Dakota's water quality. In those cases, the Department of Environment and Natural Resources develops water quality-based effluent limits. In accordance with the procedures and requirements outlined below, water quality-based effluent limits for ammonia will be developed for the city of Edgemont's wastewater treatment facility (WWTF). These limits will ensure the surface water quality standards for the Cheyenne River near the city of Edgemont are maintained and protected.

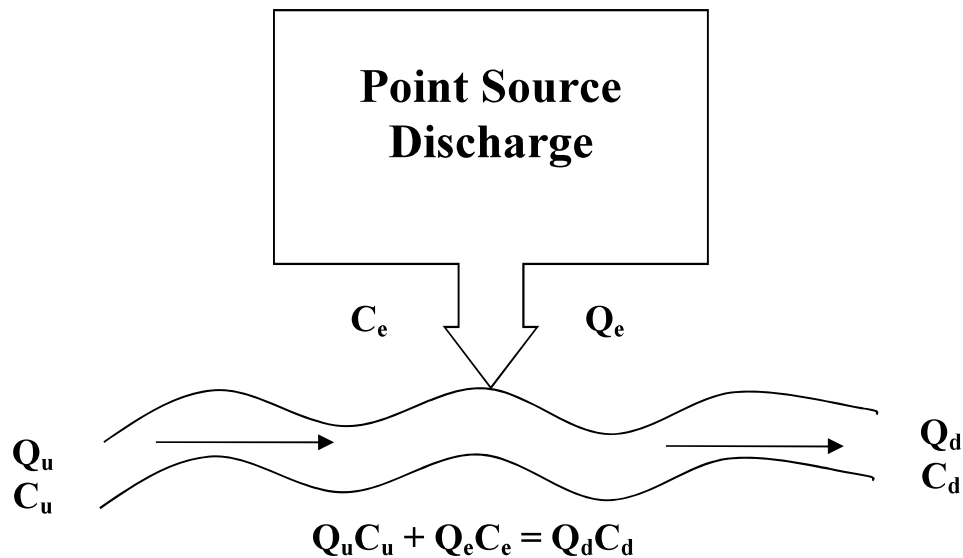
Developing the ammonia limits for the city of Edgemont's WWTF is a matter of determining the maximum level of ammonia that can be present in the Cheyenne River without causing the applicable South Dakota Surface Water Quality Standards (SDSWQS) for ammonia to be exceeded.

The effluent limits for ammonia are developed for critical conditions to be conservative, thereby assuring water quality standards are maintained under less critical conditions. Critical conditions are those at which the surface water quality standards are most likely to be violated. Critical conditions can be defined by several factors, including, but not limited to the following:

- stream flow (e.g., high, low);
- storm event occurrence and intensity;
- ambient water quality conditions (e.g., pH, temperature, etc.);
- diurnal variations in water column conditions;
- temporal occurrence of pollutant loadings from natural and human-induced activities;
- the presence or absence of salmonids; and
- the presence or absence of early life stages of aquatic life.

The following mass balance equation will be used to determine the ammonia limits for the city of Edgemont's WWTF:

**Figure 1**



Where,

- $Q_u$  = Receiving stream flow, in cubic feet per second (cfs);
- $C_u$  = Ambient upstream ammonia concentration, in milligrams per liter (mg/L);
- $Q_e$  = Effluent discharge flow rate, in cfs;
- $C_e$  = Water quality based effluent limit for ammonia in mg/L;
- $Q_d$  = Downstream flow (equal to  $Q_u + Q_e$ ), in cfs; and
- $C_d$  = Allowable instream ammonia concentration (based on the SD Surface Water Quality Standards), in mg/L.

Using the mass balance equation and the following information, the water quality-based effluent limits for ammonia can be determined for the city of Edgemont's WWTF's discharge into the Cheyenne River.

### **GEOGRAPHICAL EXTENT**

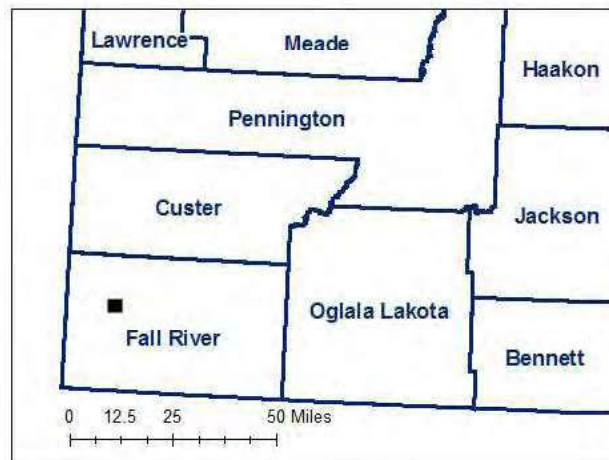
The Cheyenne River is located in the Cheyenne River Basin in the southwestern portion of the state. The Cheyenne River Basin drains approximately 9,732 square miles of land within the boundaries of the state. The area in this basin is very diverse. It includes part of the Black Hills and Badlands, rangeland, irrigated cropland, and some mining areas. The Cheyenne River originates in Wyoming, flows through the southern Black Hills, and enters Lake Oahe near the center of the state. Figure 2 shows the Cheyenne River near the city of Edgemont.

**Figure 2: The City of Edgemont Discharge near the Cheyenne River**



### Legend

- ★ Outfall 001
- ▲ USGS 06395000
- WQM 14
- Cheyenne River
- US Hwy 18



Past experience has shown that, due to the decay and transformation of organic pollutants such as ammonia, most adverse effects are generally exhibited within 10 miles of pollutant loading. While this rule of thumb can certainly vary depending on the source of the pollutant, fate and transport characteristics, hydrologic conditions, and other factors, it has generally held true in past instances. Therefore, the development of the ammonia limits for the city of Edgemont's WWTF's discharge into the Cheyenne River will be relatively narrow in spatial extent.

## ALLOWABLE INSTREAM AMMONIA CONCENTRATION ( $C_d$ )

### *South Dakota Surface Water Quality Standards*

The SDSWQS specify the beneficial uses assigned to specific water bodies. The SDSWQS also contain specific narrative and numeric criteria that must be met to ensure the protection of each beneficial use. The Cheyenne River is classified for the following beneficial uses:

- (5) Warmwater semipermanent fish life propagation waters;
- (8) Limited-contact recreation waters;
- (9) Fish and wildlife propagation, recreation, and stock watering waters; and
- (10) Irrigation waters.

Waterbodies designated in the SDSWQS with the beneficial use classification of either coldwater permanent or coldwater marginal fish life propagation are suitable for supporting salmonids. Waterbodies with the beneficial use classifications of warmwater permanent, warmwater semipermanent, or warmwater marginal fish life propagation will likely not have salmonids. Salmonids are not expected to be present in the Cheyenne River.

The presence or absence of early life stages can be assumed based on the beneficial uses assigned to the receiving stream. Early life stages are expected to be present from March 1<sup>st</sup> through October 31<sup>st</sup> based on the SDSWQS (ARSD Section 74:51:01:48).

### *Allowable Instream Ammonia Levels*

Based on the beneficial uses of the Cheyenne River, the following equations can be used to determine the total allowable ammonia concentration in the receiving stream (SDSWQS, ARSD Chapter 74:51:01, Appendix A):

#### **Equation 1: Daily Maximum (Salmonids present)**

$$Cd = \frac{0.275}{(1 + 10^{(7.204 - pH)})} + \frac{39.0}{(1 + 10^{(pH - 7.204)})}$$

#### **Equation 2: Daily Maximum (Salmonids NOT present)**

$$Cd = \frac{0.411}{(1 + 10^{(7.204 - pH)})} + \frac{58.4}{(1 + 10^{(pH - 7.204)})}$$

#### **Equation 3: 30-day Average (Early Life Stages Present)**

$$Cd = \left[ \frac{0.0577}{(1 + 10^{(7.688 - pH)})} + \frac{2.487}{(1 + 10^{(pH - 7.688)})} \right] \times MIN(2.85, 1.45 \times 10^{0.028(25 - T)})$$

#### Equation 4: 30-day Average (Early Life Stages Absent)

$$Cd = \left[ \frac{0.0577}{(1 + 10^{(7.688 - pH)})} + \frac{2.487}{(1 + 10^{(pH - 7.688)})} \right] \times [1.45 \times 10^{0.028((25 - \text{MAX}(T, 7)))]$$

pH = the pH of the water quality sample in standard units

T = the water temperature of the sample in degrees Centigrade

MIN = use either 2.85 or the value of  $1.45^{0.028(25-T)}$ , whichever is the smaller value

MAX = use either the water temperature (T) for the sample, or 7, whichever is the greater value

To develop the ammonia limits for the city of Edgemont's WWTF's discharge, equations 2, 3, and 4 will be used to determine the instream ammonia concentration,  $C_d$ , allowed in the Cheyenne River.  $C_d$  will be expressed as both 30-day average and daily maximum concentrations. The limits are determined on a monthly basis.

#### ***Instream Water Quality Monitoring***

The department maintains a statewide network of fixed monitoring stations to gain a historic record of water quality for various streams around the state. This water quality monitoring (WQM) network consists of 153 monitoring stations, which are sampled at monthly, quarterly, or seasonal intervals. The goal of this sampling is to collect reliable water quality data that reflects actual stream conditions; to collect data to determine the effectiveness of controls on point and nonpoint sources of pollution; and to collect data to evaluate the appropriateness of current beneficial use designations.

Water quality samples are collected at a WQM station on the Cheyenne River. A description of the station is listed below. Figure 2 denotes the location of WQM 14.

|        |  |
|--------|--|
| WQM 14 | At U.S. Hwy 471 bridge on NE edge of Edgemont, 700 feet upstream of Cottonwood Creek confluence (Latitude 43.305700°, Longitude -103.820820°). |
|--------|--|

Ambient water temperature, pH, and ammonia data at WQM 14 were obtained to represent instream conditions. The water quality information obtained from WQM 14 is presented in Attachment 4. The pH and temperature data are summarized in Table 1 below.

#### ***Calculation of Allowable Instream Ammonia Concentration ( $C_d$ )***

The SDSWQS specify the total ammonia concentration that is allowed at a given pH and temperature. The 80<sup>th</sup> percentile of the pH and temperature at WQM 14 was determined to ensure the ammonia standards are maintained during critical conditions. This information was used to calculate the allowable instream ammonia concentrations for each month. Table 1 summarizes the allowable instream ammonia ( $C_d$ ) for the Cheyenne River.

**Table 1: Allowable Instream Total Ammonia Concentrations for the Cheyenne River**

| Month                          | Temperature (°C) | pH (s.u.) | C <sub>d</sub> , Allowable Total Ammonia (mg/L) |               |
|--------------------------------|------------------|-----------|---|---------------|
|                                |                  |           | 30-Day Average                                  | Daily Maximum |
| January 1 – 31 (ELS absent)    | 0.00             | 7.90      | 4.54  | 10.13         |
| February 1 – 29 (ELS absent)   | 0.00             | 8.18      | 3.01  | 5.95          |
| March 1 – 31 (ELS present)     | 5.50             | 8.15      | 1.93  | 6.29          |
| April 1 – 30 (ELS present)     | 15.12            | 8.20      | 1.72  | 5.73          |
| May 1 – 31 (ELS present)       | 18.80            | 8.24      | 1.28  | 5.30          |
| June 1 – 30 (ELS present)      | 22.50            | 8.20      | 1.07  | 5.73          |
| July 1 – 31 (ELS present)      | 26.40            | 8.20      | 0.83  | 5.73          |
| August 1 – 31 (ELS present)    | 25.00            | 8.20      | 0.91  | 5.73          |
| September 1 – 30 (ELS present) | 17.00            | 8.06      | 1.90  | 7.50          |
| October 1 – 31 (ELS present)   | 11.00            | 8.10      | 2.10  | 6.95          |
| November 1 – 30 (ELS absent)   | 5.00             | 8.20      | 2.91  | 5.73          |
| December 1 – 31 (ELS absent)   | 0.00             | 8.00      | 3.95  | 8.41          |

#### AMBIENT AMMONIA CONCENTRATION (C<sub>u</sub>)

The ammonia data at WQM 14 was reviewed to determine the ambient water quality in the Cheyenne River. The 80<sup>th</sup> percentile of the ammonia data was determined to ensure the ammonia standards are maintained during critical conditions. The ammonia data from WQM 14 is presented in Attachment 4. Table 2 below summarizes the 80<sup>th</sup> percentile ammonia data for each season. This data represents the ambient ammonia concentration for the Cheyenne River (C<sub>u</sub>).

**Table 2: Ambient Ammonia Data for the Cheyenne River**

| Month            | Ammonia (mg/L) |
|------------------|----------------|
| January 1 – 31   | 0.1            |
| February 1 – 29  | 0.1            |
| March 1 – 31     | 0.13           |
| April 1 – 30     | 0.1            |
| May 1 – 31       | 0.1            |
| June 1 – 30      | 0.1            |
| July 1 – 31      | 0.1            |
| August 1 – 31    | 0.1            |
| September 1 – 30 | 0.1            |
| October 1 – 31   | 0.1            |
| November 1 – 30  | 0.1            |
| December 1 – 31  | 0.1            |

## **EFFLUENT DISCHARGE FLOW RATE ( $Q_e$ )**

The effluent discharge flow rate,  $Q_e$ , can be determined in several different ways. If effluent data is available for the discharger, the 50<sup>th</sup> or 80<sup>th</sup> percentile of the daily flow can be used. The effluent design flow rate of the wastewater treatment facility may be used as the expected effluent flow rate in the absence of actual discharge data. Alternatively, for stabilization pond systems, it may be appropriate to develop an effluent flow rate based on expected performance.

For the purposes of developing ammonia limits for the city of Edgemont's WWTF's discharge, 2.726 cfs was used for  $Q_e$ . The 2.726 cfs is based on the 80<sup>th</sup> percentile of the daily maximum flow rate reported by the city of Edgemont on DMRs to ensure the ammonia standards are maintained during critical conditions. See Attachment 5 for more details.

Table 3 summarizes the effluent flow rate used in these calculations.

## **RECEIVING STREAM FLOW ( $Q_u$ )**

The United States Geological Survey (USGS) maintains hundreds of flow monitoring sites in South Dakota. The receiving stream flow rate,  $Q_u$ , is determined from an analysis of stream flow data available, incorporating the flow considerations required by *South Dakota's Mixing Zone and Dilution Implementation Procedures*.

Critical conditions for ammonia presumably occur when stream flows are relatively low. Therefore, the ammonia limits will be developed for low stream flow conditions. Should it be determined that water quality standards are violated at other flow conditions, the permit would be reopened and new limits would be developed.

ARSD Section 74:51:01:30 specifies that surface water quality standards apply to low quality fishery waters when flows meet or exceed the minimum 7-day average low flow that can be expected to occur once every 5 years (7Q5), or 1.0 cfs, whichever is greater. The 7Q5 is therefore the minimum, or critical, flow for which the SDSWQS must be maintained, although all Surface Water Discharge permit limits remain in force below this minimum flow.

The seasonal 7Q5 flows were determined using data retrieved from the USGS gauging station USGS 06395000 and a Log Pearson type III statistical analysis. The seven-day averages are calculated for the entire data set. After the averages are calculated, the data is split into the selected seasons. Analysis is then done in accordance with the EPA guidance document *Technical Guidance Manual for Performing Wasteload Allocation* to determine the seasonal 7Q5 flow. A description of the station is listed below. Figure 2 denotes the location of the USGS gauging station.

|               |  |
|---------------|--|
| USGS 06395000 | Cheyenne River at Edgemont, SD (Latitude 43.305556°, Longitude -103.820556°) |
|---------------|--|

South Dakota's water quality standards allow a zone of mixing for discharges. In accordance with the SDSWQS, chronic water quality criteria must be met at the end of the mixing zone; the acute criteria must be met at all times within the mixing zone. The mixing zone is therefore a

limited portion of a water body where mixing of the effluent and receiving stream is in progress, but not complete. In some cases, the discharge will not completely mix with the entire receiving stream. There are many factors that influence the rate of mixing in a stream. A few of these factors are the flow and velocity of the receiving stream, the flow and velocity of the effluent, the slope of the stream, and other stream characteristics.

The *South Dakota Mixing Zone and Dilution Implementation Procedures* outlines an approach for modeling the mixing zone. Using these procedures, the 7Q5 is adjusted to account for the allowable ratio of flow available in the receiving stream. This adjusted flow represents the receiving stream flow rate ( $Q_u$ ).

Table 3 and Attachment 6 summarize the flow data and the determination of  $Q_u$  for the Cheyenne River.

**Table 3: Critical Low Flow Values for the Cheyenne River**

| Month            | 7Q5 Low Flow (cfs) | Effluent Flow (cfs) | Ratio of Effluent to 7Q5 | Allowable Ratio of 7Q5 | Critical Low Flow $Q_u$ (cfs) |
|------------------|--------------------|---------------------|--------------------------|------------------------|-------------------------------|
| January 1 – 31   | 1.04               | 2.73                | 2.63                     | 1.00                   | 1.04                          |
| February 1 – 29  | 3.02               | 2.73                | 0.90                     | 1.00                   | 3.02                          |
| March 1 – 31     | 6.05               | 2.73                | 0.45                     | 0.50                   | 3.02                          |
| April 1 – 30     | 6.23               | 2.73                | 0.44                     | 0.50                   | 3.12                          |
| May 1 – 31       | 5.82               | 2.73                | 0.47                     | 0.50                   | 2.91                          |
| June 1 – 30      | 2.00               | 2.73                | 1.36                     | 1.00                   | 2.00                          |
| July 1 – 31      | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |
| August 1 – 31    | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |
| September 1 – 30 | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |
| October 1 – 31   | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |
| November 1 – 30  | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |
| December 1 – 31  | 1.00               | 2.73                | 2.73                     | 1.00                   | 1.00                          |

Since the 7Q5 value for July – December is less than 1.0 cfs, ARSD Section 74:51:01:30 states that 1.0 cfs will be used in the calculations.

### **DOWNSTREAM FLOW RATE ( $Q_d$ )**

The downstream flow rate,  $Q_d$ , is simply the sum of the upstream flow rate ( $Q_u$ ) and the effluent flow rate ( $Q_e$ ). The downstream flow rate used for the calculation of the ammonia limits for the city of Edgemont's WWTF's discharge into the Cheyenne River is summarized in Table 4 below.

### **CALCULATION OF AMMONIA LIMIT ( $C_e$ )**

Each of the variables determined above is summarized in Table 4. Using the mass balance equation, the ammonia limits for the city of Edgemont's WWTF's discharge into the Cheyenne River can be calculated as follows:

$$C_e = \frac{(Q_d * C_d) - (Q_u * C_u)}{Q_e}$$

The water quality-based effluent limits for ammonia for the city of Edgemont's WWTF's discharge into the Cheyenne River are presented in Table 4.

**Table 4: Variables Calculated for Mass Balance Equation**

| Month            | C <sub>u</sub> ,<br>mg/L | C <sub>d</sub> , mg/L |                  | Q <sub>e</sub> ,<br>cfs | Q <sub>d</sub> ,<br>cfs | C <sub>e</sub> , mg/L |                  |
|------------------|--------------------------|-----------------------|------------------|-------------------------|-------------------------|-----------------------|------------------|
|                  |                          | 30-day<br>Average     | Daily<br>Maximum |                         |                         | 30-Day<br>Average     | Daily<br>Maximum |
| January 1 – 31   | 0.10                     | 4.54                  | 10.13            | 2.73                    | 3.76                    | 6.2                   | 13.9             |
| February 1 – 29  | 0.10                     | 3.01                  | 5.95             | 2.73                    | 5.74                    | 6.2                   | 12.4             |
| March 1 – 31     | 0.13                     | 1.93                  | 6.29             | 2.73                    | 5.75                    | 3.9                   | 13.1             |
| April 1 – 30     | 0.10                     | 1.72                  | 5.73             | 2.73                    | 5.84                    | 3.6                   | 12.2             |
| May 1 – 31       | 0.10                     | 1.28                  | 5.30             | 2.73                    | 5.63                    | 2.5                   | 10.8             |
| June 1 – 30      | 0.10                     | 1.07                  | 5.73             | 2.73                    | 4.73                    | 1.8                   | 9.9              |
| July 1 – 31      | 0.10                     | 0.83                  | 5.73             | 2.73                    | 3.73                    | 1.1                   | 7.8              |
| August 1 – 31    | 0.10                     | 0.91                  | 5.73             | 2.73                    | 3.73                    | 1.2                   | 7.8              |
| September 1 – 30 | 0.10                     | 1.90                  | 7.50             | 2.73                    | 3.73                    | 2.6                   | 10.2             |
| October 1 – 31   | 0.10                     | 2.10                  | 6.95             | 2.73                    | 3.73                    | 2.8                   | 9.5              |
| November 1 – 30  | 0.10                     | 2.91                  | 5.73             | 2.73                    | 3.73                    | 3.9                   | 7.8              |
| December 1 – 31  | 0.10                     | 3.95                  | 8.41             | 2.73                    | 3.73                    | 5.4                   | 11.5             |

The city of Edgemont's WWTF's current permit contains ammonia limits. The current effluent limits were compared to the limits calculated using the information presented above. A comparison of the two limits is presented in Table 5 below.

During the months of March – October, the city's current limits are adequate to protect the beneficial use and the water quality criteria for the Cheyenne River. These limits will be continued in the draft permit, to prevent backsliding. During the remaining months, it was necessary to establish more stringent limits. The shaded values in Table 5 indicate the limits that will be draft for the city of Edgemont's WWTF's discharge.

**Table 5: Comparison of Current and Draft Effluent Limits**

| Month            | Current Effluent Limits |                      | Calculated Effluent Limits |                      |
|------------------|-------------------------|----------------------|----------------------------|----------------------|
|                  | 30-Day Average (mg/L)   | Daily Maximum (mg/L) | 30-Day Average (mg/L)      | Daily Maximum (mg/L) |
| January 1 – 31   | 7.9                     | 18.6                 | 6.2                        | 13.9                 |
| February 1 – 29  | 7.9                     | 18.6                 | 6.2                        | 12.4                 |
| March 1 – 31     | 1.6                     | 2.9                  | 3.9                        | 13.1                 |
| April 1 – 30     | 1.6                     | 2.9                  | 3.6                        | 12.2                 |
| May 1 – 31       | 1.6                     | 2.9                  | 2.5                        | 10.8                 |
| June 1 – 30      | 1.0                     | 1.5                  | 1.8                        | 9.9                  |
| July 1 – 31      | 1.0                     | 1.5                  | 1.1                        | 7.8                  |
| August 1 – 31    | 1.0                     | 1.5                  | 1.2                        | 7.8                  |
| September 1 – 30 | 1.5                     | 2.7                  | 2.6                        | 10.2                 |
| October 1 – 31   | 1.5                     | 2.7                  | 2.8                        | 9.5                  |
| November 1 – 30  | 7.9                     | 18.6                 | 3.9                        | 7.8                  |
| December 1 – 31  | 7.9                     | 18.6                 | 5.4                        | 11.5                 |

# **ATTACHMENT 4**

## **Water Quality Data**

WQM data was obtained from the water quality monitoring station WQM 14. The period of the data is from January 1, 2003 through November 30, 2018. This data can be obtained at <https://www.waterqualitydata.us/portal/>

### WQM 14 Raw and Reduced Data

**Note:** The method detection limit was used in calculations for any “Below Detection” value.

#### January

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 01/23/2003             | Below Detection         | 1                   | 7.87        | 0                |
| 01/12/2006             | Below Detection         | 0.1                 | 8.2         | 0                |
| 01/08/2007             | Below Detection         | 0.1                 | 7.9         | 0                |
| 01/15/2008             | Below Detection         | 0.1                 | 7.5         | 0                |
| 01/21/2009             | Below Detection         | 0.1                 | 7.9         | 0                |
| 01/13/2010             | Below Detection         | 0.05                | 7.8         | 0                |
| 01/25/2011             | Below Detection         | 0.1                 | 7.9         | 0                |
| 01/18/2012             | Below Detection         | 0.1                 | 7.8         | 0                |
| 01/10/2013             | 0.2                     | 0.2                 | 7.4         | 0                |
| 01/17/2014             | Below Detection         | 0.1                 | 8           | 0                |
| 01/16/2015             | 0.1                     | 0.1                 | 7.8         | 0                |
| Count                  |                         | 11                  | 11          | 11               |
| Average                |                         | 0.19                | 7.82        | 0.00             |
| 20th Percentile        |                         | 0.10                | 7.80        | 0.00             |
| 50th Percentile        |                         | 0.10                | 7.87        | 0.00             |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>7.90</b> | <b>0.00</b>      |

#### February

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 02/27/2006             | Below Detection         | 0.1                 | 7.8         | 0                |
| 02/26/2007             | Below Detection         | 0.1                 | 8           | 0                |
| 02/07/2008             | 0.1                     | 0.1                 | 7.6         | 0                |
| 02/24/2009             | Below Detection         | 0.1                 | 7.7         | 0                |
| 02/10/2010             | Below Detection         | 0.05                | 8.2         | 0                |
| 02/22/2011             | 0.2                     | 0.2                 | 8           | 0                |
| 02/16/2012             | Below Detection         | 0.1                 | 7.9         | 0                |
| 02/19/2013             | Below Detection         | 0.1                 | 7.9         | 0                |
| 02/19/2014             | 0.6                     | 0.6                 | 8.5         | 0                |
| 02/27/2015             | 0.065                   | 0.065               | 8.1         | 0                |
| 02/11/2016             | Below Detection         | 0.05                | 8.3         | 0                |
| 02/13/2017             | Below Detection         | 0.05                | 8           | 0                |
| Count                  |                         | 12                  | 12          | 12               |
| Average                |                         | 0.13                | 8.00        | 0.00             |
| 20th Percentile        |                         | 0.05                | 7.82        | 0.00             |
| 50th Percentile        |                         | 0.10                | 8.00        | 0.00             |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.18</b> | <b>0.00</b>      |

### March

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 03/09/2004             | 0.112                   | 0.112               | 8.06        | 7.51             |
| 03/23/2004             | Below Detection         | 0.1                 | 8.14        | 14.04            |
| 03/15/2007             | 0.10                    | 0.1                 | 8.1         | 4                |
| 03/13/2008             | Below Detection         | 0.1                 | 8           | 0                |
| 03/18/2010             | Below Detection         | 0.05                | 8.1         | 3                |
| 03/17/2011             | 0.30                    | 0.3                 | 8           | 5                |
| 03/12/2012             | Below Detection         | 0.1                 | 8.1         | 1                |
| 03/19/2013             | Below Detection         | 0.1                 | 8.2         | 3                |
| 03/17/2014             | 0.20                    | 0.2                 | 8.1         | 3                |
| 03/17/2015             | Below Detection         | 0.05                | 8.2         | 5                |
| Count                  | 10                      | 10                  | 10          | 10               |
| Average                | 0.12                    | 8.10                | 4.56        |                  |
| 20th Percentile        | 0.09                    | 8.05                | 2.60        |                  |
| 50th Percentile        | 0.10                    | 8.10                | 3.50        |                  |
| <b>80th Percentile</b> | <b>0.13</b>             | <b>8.15</b>         | <b>5.50</b> |                  |

### April

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)    | Temperature (°C) |
|------------------------|-------------------------|---------------------|--------------|------------------|
| 04/21/2003             | Below Detection         | 1                   | 8.1          | 14.3             |
| 04/21/2004             | Below Detection         | 0.1                 | 7.97         | 15.12            |
| 04/10/2006             | Below Detection         | 0.1                 | 7.9          | 14               |
| 04/18/2007             | Below Detection         | 0.1                 | 8.1          | 16               |
| 04/16/2009             | Below Detection         | 0.1                 | 8.1          | 8                |
| 04/20/2010             | Below Detection         | 0.05                | 8.2          | 14               |
| 04/26/2011             | Below Detection         | 0.1                 | 8.2          | 10               |
| 04/11/2012             | Below Detection         | 0.1                 | 8.2          | 13               |
| 04/29/2013             | Below Detection         | 0.1                 | 8.2          | 17               |
| 04/15/2014             | Below Detection         | 0.1                 | 8.3          | 5                |
| 04/06/2015             | Below Detection         | 0.05                | 8.2          | 10               |
| Count                  | 11                      | 11                  | 11           | 11               |
| Average                | 0.17                    | 8.13                | 12.40        |                  |
| 20th Percentile        | 0.10                    | 8.10                | 10.00        |                  |
| 50th Percentile        | 0.10                    | 8.20                | 14.00        |                  |
| <b>80th Percentile</b> | <b>0.10</b>             | <b>8.20</b>         | <b>15.12</b> |                  |

### May

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 05/14/2003             | Below Detection         | 1                   | 8.1         | 15.1             |
| 05/17/2004             | Below Detection         | 0.1                 | 7.79        | 13.72            |
| 05/24/2006             | Below Detection         | 0.1                 | 8           | 16               |
| 05/17/2007             | Below Detection         | 0.1                 | 8.4         | 18               |
| 05/20/2008             | Below Detection         | 0.1                 | 8.2         | 20               |
| 05/19/2009             | Below Detection         | 0.1                 | 8.2         | 22               |
| 05/17/2010             | Below Detection         | 0.05                | 8.2         | 15               |
| 05/10/2011             | Below Detection         | 0.1                 | 8.3         | 17               |
| 05/10/2012             | Below Detection         | 0.1                 | 8.1         | 21               |
| 05/13/2013             | Below Detection         | 0.1                 | 8           | 16               |
| 05/13/2014             | Below Detection         | 0.1                 | 8.2         | 8                |
| 05/05/2015             | Below Detection         | 0.05                | 8.2         | 13               |
| 05/18/2016             | Below Detection         | 0.05                | 8.4         | 16               |
| 05/04/2017             | Below Detection         | 0.05                | 8.2         | 15               |
| Count                  |                         | 14                  | 14          | 14               |
| Average                |                         | 0.15                | 8.16        | 16.13            |
| 20th Percentile        |                         | 0.05                | 8.06        | 14.49            |
| 50th Percentile        |                         | 0.10                | 8.20        | 16.00            |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.24</b> | <b>18.80</b>     |

### June

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 06/10/2003             | Below Detection         | 1                   | 8           | 22.5             |
| 06/09/2004             | Below Detection         | 0.1                 | 7.9         | 14               |
| 06/27/2006             | Below Detection         | 0.1                 | 7.8         | 25               |
| 06/18/2007             | Below Detection         | 0.1                 | 8.2         | 18               |
| 06/12/2008             | Below Detection         | 0.1                 | 8.2         | 14               |
| 06/25/2009             | Below Detection         | 0.1                 | 8.2         | 22               |
| 06/17/2010             | Below Detection         | 0.05                | 7.9         | 19               |
| 06/16/2011             | Below Detection         | 0.1                 | 8.2         | 19               |
| 06/13/2012             | Below Detection         | 0.1                 | 8           | 26               |
| 06/03/2013             | 0.4                     | 0.4                 | 7.7         | 17               |
| 06/17/2014             | Below Detection         | 0.1                 | 8.1         | 22               |
| Count                  |                         | 11                  | 11          | 11               |
| Average                |                         | 0.20                | 8.02        | 19.86            |
| 20th Percentile        |                         | 0.10                | 7.90        | 17.00            |
| 50th Percentile        |                         | 0.10                | 8.00        | 19.00            |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.20</b> | <b>22.50</b>     |

**July**

| <b>Date</b>            | <b>Ammonia Reported (mg/L)</b> | <b>Ammonia Used (mg/L)</b> | <b>pH (s.u.)</b> | <b>Temperature (°C)</b> |
|------------------------|--------------------------------|----------------------------|------------------|-------------------------|
| 07/15/2003             | Below Detection                | 1                          | 8                | 26.4                    |
| 07/13/2004             | Below Detection                | 0.1                        | 8                | 26                      |
| 07/31/2006             | Below Detection                | 0.1                        | 8                | 24                      |
| 07/16/2007             | Below Detection                | 0.1                        | 8.1              | 29                      |
| 07/09/2008             | Below Detection                | 0.1                        | 8.2              | 24                      |
| 07/22/2009             | Below Detection                | 0.1                        | 8.1              | 24                      |
| 07/26/2010             | Below Detection                | 0.05                       | 8.1              | 25                      |
| 07/12/2011             | Below Detection                | 0.1                        | 8.1              | 19                      |
| 07/16/2012             | Below Detection                | 0.1                        | 7.9              | 27                      |
| 07/16/2013             | Below Detection                | 0.1                        | 8.2              | 26                      |
| 07/07/2014             | Below Detection                | 0.1                        | 8.2              | 26                      |
| Count                  |                                | 11                         | 11               | 11                      |
| Average                |                                | 0.18                       | 8.08             | 25.13                   |
| 20th Percentile        |                                | 0.10                       | 8.00             | 24.00                   |
| 50th Percentile        |                                | 0.10                       | 8.10             | 26.00                   |
| <b>80th Percentile</b> |                                | <b>0.10</b>                | <b>8.20</b>      | <b>26.40</b>            |

**August**

| <b>Date</b>            | <b>Ammonia Reported (mg/L)</b> | <b>Ammonia Used (mg/L)</b> | <b>pH (s.u.)</b> | <b>Temperature (°C)</b> |
|------------------------|--------------------------------|----------------------------|------------------|-------------------------|
| 08/18/2003             | Below Detection                | 1                          | 7.9              | 24.2                    |
| 08/24/2004             | Below Detection                | 0.1                        | 8.1              | 18                      |
| 08/16/2006             | Below Detection                | 0.1                        | 8                | 24                      |
| 08/16/2007             | Below Detection                | 0.1                        | 7.7              | 26                      |
| 08/25/2008             | Below Detection                | 0.1                        | 8.1              | 24                      |
| 08/26/2009             | Below Detection                | 0.1                        | 8.2              | 21                      |
| 08/12/2010             | Below Detection                | 0.05                       | 8                | 23                      |
| 08/15/2011             | Below Detection                | 0.1                        | 8.2              | 23                      |
| 08/15/2012             | Below Detection                | 0.1                        | 8.1              | 22                      |
| 08/20/2013             | Below Detection                | 0.1                        | 8                | 25                      |
| 08/20/2014             | Below Detection                | 0.1                        | 8                | 27                      |
| 08/10/2015             | Below Detection                | 0.05                       | 8.1              | 25                      |
| 08/23/2016             | Below Detection                | 0.05                       | 8.3              | 21                      |
| 08/22/2017             | Below Detection                | 0.05                       | 8.2              | 23                      |
| Count                  |                                | 14                         | 14               | 14                      |
| Average                |                                | 0.15                       | 8.06             | 23.30                   |
| 20th Percentile        |                                | 0.05                       | 8.00             | 21.60                   |
| 50th Percentile        |                                | 0.10                       | 8.10             | 23.50                   |
| <b>80th Percentile</b> |                                | <b>0.10</b>                | <b>8.20</b>      | <b>25.00</b>            |

### September

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 09/26/2003             | Below Detection         | 1                   | 6.9         | 12.77            |
| 09/05/2004             | 0.12                    | 0.12                | 7.9         | 18               |
| 09/14/2004             | Below Detection         | 0.1                 | 7.7         | 17               |
| 09/13/2005             | Below Detection         | 0.1                 | 8           | 16               |
| 09/27/2006             | Below Detection         | 0.1                 | 8           | 13               |
| 09/10/2007             | Below Detection         | 0.1                 | 7.8         | 18               |
| 09/25/2008             | Below Detection         | 0.1                 | 7.9         | 17               |
| 09/22/2009             | Below Detection         | 0.1                 | 8.1         | 13               |
| 09/21/2010             | Below Detection         | 0.05                | 7.9         | 17               |
| 09/28/2011             | Below Detection         | 0.1                 | 8.1         | 15               |
| 09/25/2012             | Below Detection         | 0.1                 | 7.8         | 17               |
| 09/24/2013             | Below Detection         | 0.1                 | 8.1         | 15               |
| 09/04/2014             | Below Detection         | 0.1                 | 8           | 17               |
| Count                  |                         | 13                  | 13          | 13               |
| Average                |                         | 0.17                | 7.86        | 15.83            |
| 20th Percentile        |                         | 0.10                | 7.80        | 13.80            |
| 50th Percentile        |                         | 0.10                | 7.90        | 17.00            |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.06</b> | <b>17.00</b>     |

### October

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 10/21/2003             | 0.04                    | 0.04                | 8.03        | 7.95             |
| 10/12/2004             | Below Detection         | 0.1                 | 7.4         | 17               |
| 10/11/2005             | Below Detection         | 0.1                 | 8.1         | 11               |
| 10/26/2006             | Below Detection         | 0.1                 | 7.9         | 7                |
| 10/29/2007             | 0.1                     | 0.1                 | 7.7         | 8                |
| 10/21/2008             | Below Detection         | 0.1                 | 8.1         | 10               |
| 10/26/2009             | Below Detection         | 0.1                 | 8.1         | 4                |
| 10/13/2010             | Below Detection         | 0.05                | 8.1         | 10               |
| 10/16/2012             | Below Detection         | 0.1                 | 7.9         | 11               |
| 10/31/2013             | Below Detection         | 0.1                 | 8.2         | 5                |
| 10/15/2014             | Below Detection         | 0.1                 | 8           | 10               |
| Count                  |                         | 11                  | 11          | 11               |
| Average                |                         | 0.09                | 7.96        | 9.18             |
| 20th Percentile        |                         | 0.10                | 7.90        | 7.00             |
| 50th Percentile        |                         | 0.10                | 8.03        | 10.00            |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.10</b> | <b>11.00</b>     |

### November

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 11/18/2003             | Below Detection         | 0.01                | 8.18        | 4.11             |
| 11/18/2004             | Below Detection         | 0.1                 | 7.8         | 1                |
| 11/08/2005             | Below Detection         | 0.1                 | 8.2         | 6                |
| 11/15/2006             | Below Detection         | 0.1                 | 8           | 1                |
| 11/26/2007             | Below Detection         | 0.1                 | 8.1         | 1                |
| 11/12/2008             | Below Detection         | 0.1                 | 8.2         | 5                |
| 11/17/2009             | Below Detection         | 0.1                 | 8.2         | 2                |
| 11/18/2010             | Below Detection         | 0.05                | 8           | 1                |
| 11/08/2011             | Below Detection         | 0.1                 | 8.2         | 0                |
| 11/14/2012             | Below Detection         | 0.1                 | 7.9         | 0                |
| 11/19/2013             | Below Detection         | 0.1                 | 8.2         | 2                |
| 11/05/2014             | Below Detection         | 0.1                 | 8.2         | 5                |
| 11/17/2015             | Below Detection         | 0.05                | 8.4         | 2                |
| 11/15/2016             | Below Detection         | 0.05                | 8.2         | 7                |
| 11/08/2017             | Below Detection         | 0.05                | 8.2         | 2                |
| Count                  |                         | 15                  | 15          | 15               |
| Average                |                         | 0.08                | 8.13        | 2.61             |
| 20th Percentile        |                         | 0.05                | 8.00        | 1.00             |
| 50th Percentile        |                         | 0.10                | 8.20        | 2.00             |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.20</b> | <b>5.00</b>      |

### December

| Date                   | Ammonia Reported (mg/L) | Ammonia Used (mg/L) | pH (s.u.)   | Temperature (°C) |
|------------------------|-------------------------|---------------------|-------------|------------------|
| 12/16/2003             | Below Detection         | 0.01                | 7.92        | -0.13            |
| 12/13/2004             | Below Detection         | 0.1                 | 7.9         | 0                |
| 12/08/2005             | Below Detection         | 0.1                 | 7.9         | 0                |
| 12/14/2006             | Below Detection         | 0.1                 | 8           | 0                |
| 12/18/2007             | Below Detection         | 0.1                 | 7.8         | 0                |
| 12/17/2008             | Below Detection         | 0.1                 | 7.8         | 0                |
| 12/10/2009             | Below Detection         | 0.1                 | 7.8         | 0                |
| 12/09/2010             | Below Detection         | 0.05                | 8           | 0                |
| 12/12/2011             | Below Detection         | 0.1                 | 7.9         | 0                |
| 12/13/2012             | Below Detection         | 0.1                 | 8           | 0                |
| 12/18/2013             | Below Detection         | 0.1                 | 8.2         | 0                |
| 12/08/2014             | Below Detection         | 0.1                 | 7.8         | 0                |
| Count                  |                         | 12                  | 12          | 12               |
| Average                |                         | 0.09                | 7.92        | -0.01            |
| 20th Percentile        |                         | 0.10                | 7.80        | 0.00             |
| 50th Percentile        |                         | 0.10                | 7.90        | 0.00             |
| <b>80th Percentile</b> |                         | <b>0.10</b>         | <b>8.00</b> | <b>0.00</b>      |

# **ATTACHMENT 5**

## **Point Source Dischargers Flow Rate**

### Raw and Reduced Effluent Flow Data

|                              | Flow rate         |                 |
|------------------------------|-------------------|-----------------|
|                              | 30 Day Avg. (MGD) | Daily Max (MGD) |
| <b>February 2010</b>         | 1.29              | 1.29            |
| <b>February 2011</b>         | 1.88              | 1.88            |
| <b>February 2012</b>         | 1.88              | 1.89            |
| <b>February 2013</b>         | 1.87              | 1.89            |
| <b>March 2014</b>            | 0.28              | 0.28            |
| <b>April 2014</b>            | 0.1               | 0.1             |
| <b>February 2015</b>         | 0.29              | 0.29            |
| <b>March 2015</b>            | 0.29              | 0.29            |
| <b>January 2016</b>          | 0.72              | 0.72            |
| <b>February 2016</b>         | 0.72              | 0.72            |
| <b>March 2016</b>            | 0.72              | 0.72            |
| <b>April 2017</b>            | 0.72              | 10.08*          |
| Average                      |                   | 0.90            |
| 50th Percentile              |                   | 0.72            |
| 80th Percentile              |                   | 1.76            |
| <b>80th Percentile (cfs)</b> |                   | <b>2.73</b>     |

\*The Daily Maximum reported for April 2017 was inconsistent with other flow rate information. The 30-Day Average of 0.72 MGD was used in the calculations for this month.

# **ATTACHMENT 6**

## **Receiving Stream Flow Data**

**RECEIVING STREAMFLOW DATA**  
**USGS 06395000 Gauging Station**

The data to develop the seasonal 7Q5 low flows was obtained from the USGS gauging station USGS 06395000. The period of the data is from January 1, 2003 through December 31, 2017. This data can be obtained at <http://waterdata.usgs.gov/sd/nwis/sw>.

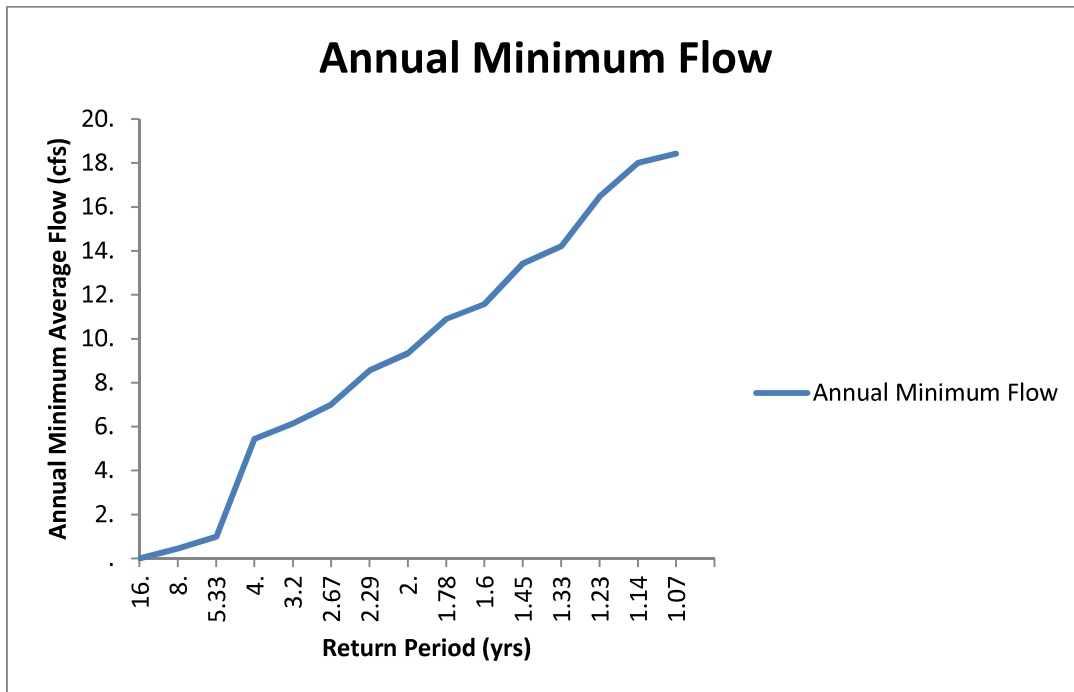
**Monthly 7Q5s**

| Month | 7Q5    |
|-------|--------|
| Jan   | 1.0354 |
| Feb   | 3.0158 |
| Mar   | 6.0496 |
| Apr   | 6.2305 |
| May   | 5.8171 |
| Jun   | 1.9991 |
| Jul   | 0.1039 |
| Aug   | 0.0516 |
| Sep   | 0.0708 |
| Oct   | 0.0172 |
| Nov   | 0.995  |
| Dec   | 0.847  |

**Calculation Statistics**

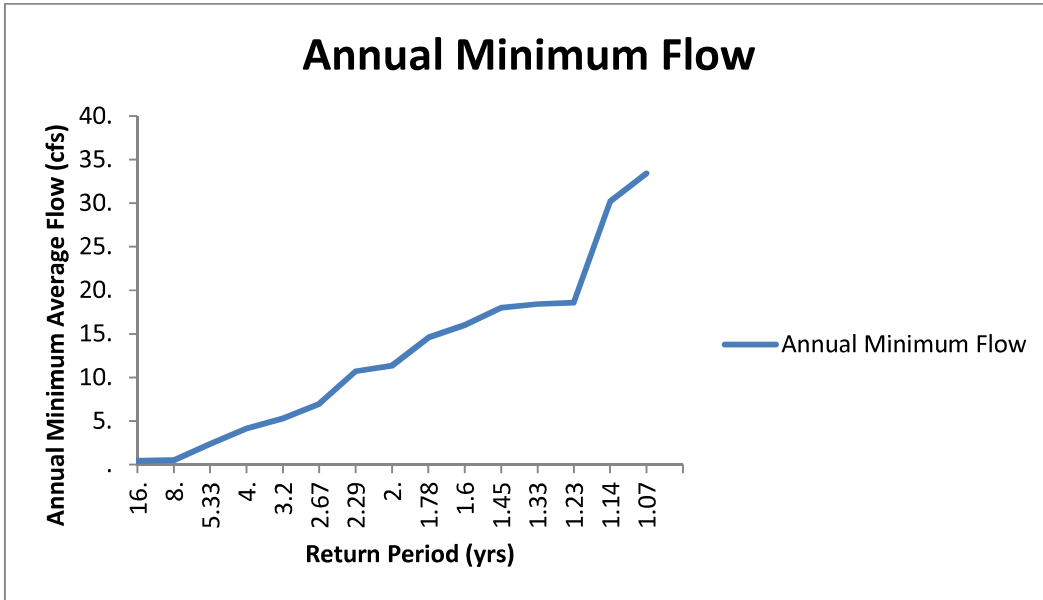
| Month | Standard Deviation | Skew      | zfactor   | kfactor |
|-------|--------------------|-----------|-----------|---------|
| Jan   | 4.068874           | -3.872984 | -0.839527 | -0.219  |
| Feb   | 1.301612           | -1.377495 | -0.839527 | -0.699  |
| Mar   | 1.207279           | 0.748755  | -0.839527 | -0.853  |
| Apr   | 0.993312           | 0.091962  | -0.839527 | -0.844  |
| May   | 0.948493           | 0.171429  | -0.839527 | -0.847  |
| Jun   | 2.098383           | -0.537519 | -0.839527 | -0.801  |
| Jul   | 4.570038           | -2.406148 | -0.839527 | -0.52   |
| Aug   | 4.502515           | -2.166091 | -0.839527 | -0.566  |
| Sep   | 4.237474           | -2.511049 | -0.839527 | -0.5    |
| Oct   | 5.438355           | -2.063959 | -0.839527 | -0.585  |
| Nov   | 2.340961           | -2.108687 | -0.839527 | -0.577  |
| Dec   | 4.039872           | -3.812876 | -0.839527 | -0.232  |

## January



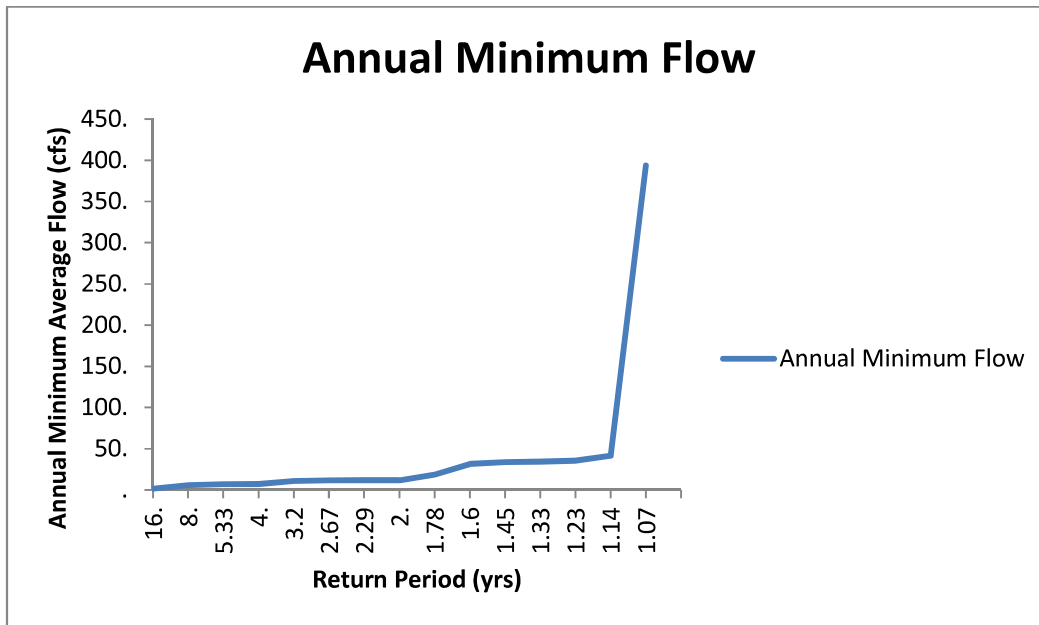
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2008 | 1    | 16.00         | 0.00                | -13.82   |
| 2017 | 2    | 8.00          | 0.45                | -0.79    |
| 2009 | 3    | 5.33          | 0.99                | -0.01    |
| 2007 | 4    | 4.00          | 5.44                | 1.69     |
| 2010 | 5    | 3.2           | 6.14                | 1.82     |
| 2013 | 6    | 2.67          | 7.00                | 1.95     |
| 2005 | 7    | 2.29          | 8.56                | 2.15     |
| 2011 | 8    | 2.00          | 9.34                | 2.23     |
| 2006 | 9    | 1.78          | 10.9                | 2.39     |
| 2004 | 10   | 1.60          | 11.57               | 2.45     |
| 2003 | 11   | 1.45          | 13.43               | 2.60     |
| 2015 | 12   | 1.33          | 14.21               | 2.65     |
| 2016 | 13   | 1.23          | 16.46               | 2.80     |
| 2012 | 14   | 1.14          | 18.00               | 2.89     |
| 2014 | 15   | 1.07          | 18.43               | 2.91     |

## February



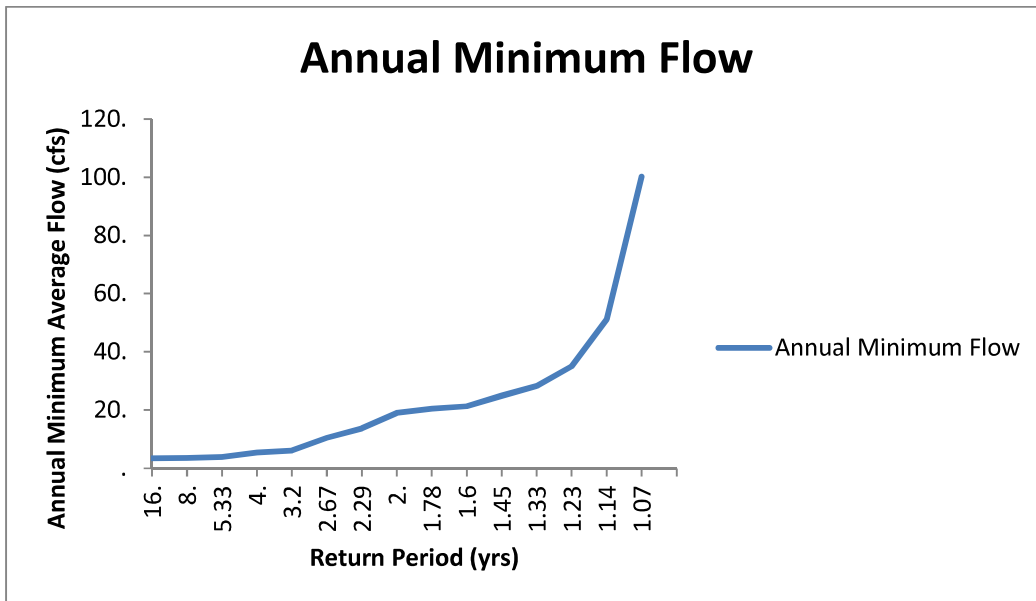
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2008 | 1    | 16.00         | 0.41                | -0.89    |
| 2017 | 2    | 8.00          | 0.51                | -0.68    |
| 2009 | 3    | 5.33          | 2.37                | 0.86     |
| 2007 | 4    | 4.00          | 4.14                | 1.42     |
| 2010 | 5    | 3.20          | 5.27                | 1.66     |
| 2006 | 6    | 2.67          | 6.97                | 1.94     |
| 2004 | 7    | 2.29          | 10.71               | 2.37     |
| 2011 | 8    | 2.00          | 11.36               | 2.43     |
| 2003 | 9    | 1.78          | 14.57               | 2.68     |
| 2005 | 10   | 1.60          | 16.00               | 2.77     |
| 2013 | 11   | 1.45          | 18.00               | 2.89     |
| 2012 | 12   | 1.33          | 18.43               | 2.91     |
| 2014 | 13   | 1.23          | 18.57               | 2.92     |
| 2016 | 14   | 1.14          | 30.21               | 3.41     |
| 2015 | 15   | 1.07          | 33.41               | 3.51     |

## March



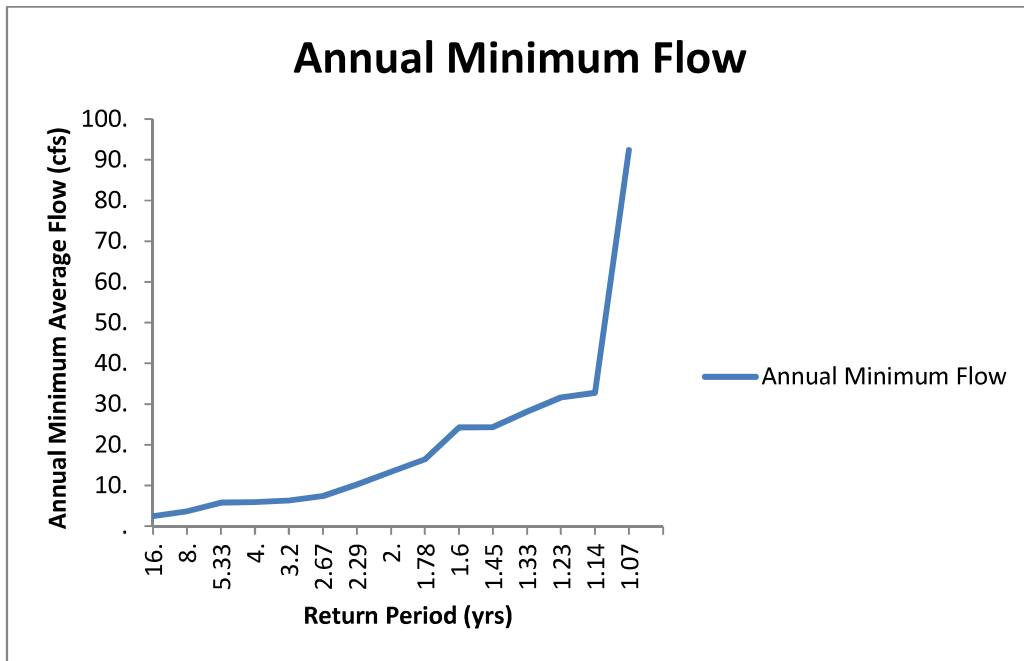
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2008 | 1    | 16.00         | 1.50                | 0.41     |
| 2005 | 2    | 8.00          | 5.73                | 1.75     |
| 2009 | 3    | 5.33          | 6.81                | 1.92     |
| 2007 | 4    | 4.00          | 7.12                | 1.96     |
| 2006 | 5    | 3.20          | 10.74               | 2.37     |
| 2003 | 6    | 2.67          | 11.57               | 2.45     |
| 2004 | 7    | 2.29          | 11.64               | 2.45     |
| 2010 | 8    | 2.00          | 11.67               | 2.46     |
| 2013 | 9    | 1.78          | 18.43               | 2.91     |
| 2012 | 10   | 1.60          | 31.43               | 3.45     |
| 2014 | 11   | 1.45          | 33.71               | 3.52     |
| 2015 | 12   | 1.33          | 34.30               | 3.54     |
| 2017 | 13   | 1.23          | 35.37               | 3.57     |
| 2016 | 14   | 1.14          | 41.34               | 3.72     |
| 2011 | 15   | 1.07          | 393.86              | 5.98     |

## April



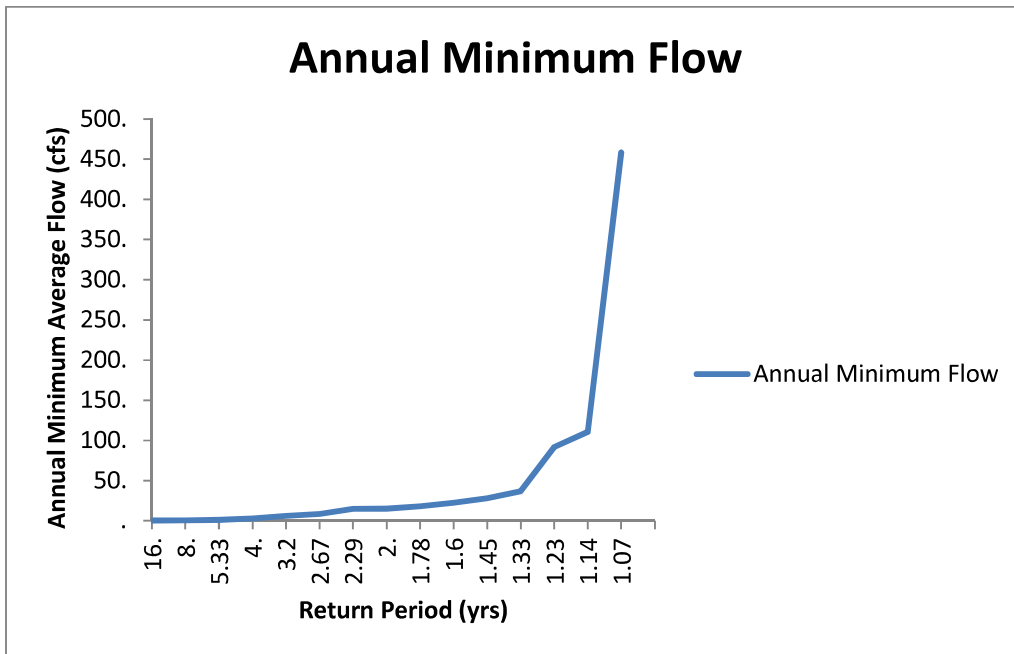
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2007 | 1    | 16.00         | 3.46                | 1.24     |
| 2004 | 2    | 8.00          | 3.51                | 1.26     |
| 2005 | 3    | 5.33          | 3.87                | 1.35     |
| 2008 | 4    | 4.00          | 5.43                | 1.69     |
| 2006 | 5    | 3.20          | 6.15                | 1.82     |
| 2013 | 6    | 2.67          | 10.49               | 2.35     |
| 2010 | 7    | 2.29          | 13.70               | 2.62     |
| 2015 | 8    | 2.00          | 19.04               | 2.95     |
| 2003 | 9    | 1.78          | 20.49               | 3.02     |
| 2016 | 10   | 1.60          | 21.31               | 3.06     |
| 2012 | 11   | 1.45          | 24.94               | 3.22     |
| 2017 | 12   | 1.33          | 28.29               | 3.34     |
| 2009 | 13   | 1.23          | 35.04               | 3.56     |
| 2014 | 14   | 1.14          | 51.17               | 3.94     |
| 2011 | 15   | 1.07          | 100.23              | 4.61     |

## May



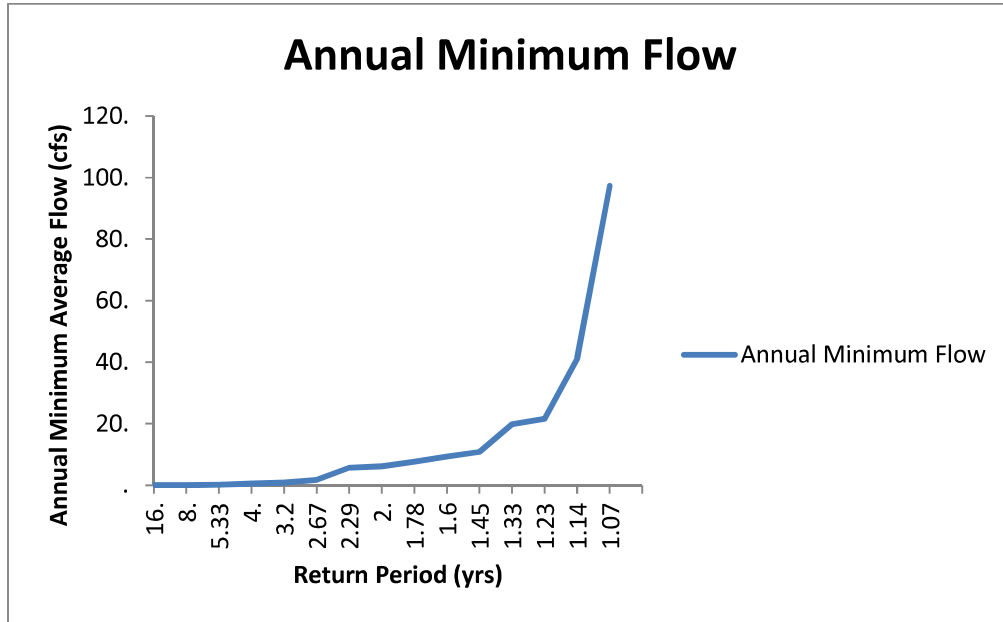
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2004 | 1    | 16.00         | 2.48                | 0.91     |
| 2007 | 2    | 8.00          | 3.60                | 1.28     |
| 2013 | 3    | 5.33          | 5.79                | 1.76     |
| 2008 | 4    | 4.00          | 5.88                | 1.77     |
| 2005 | 5    | 3.20          | 6.29                | 1.84     |
| 2006 | 6    | 2.67          | 7.44                | 2.01     |
| 2003 | 7    | 2.29          | 10.23               | 2.33     |
| 2012 | 8    | 2.00          | 13.33               | 2.59     |
| 2009 | 9    | 1.78          | 16.40               | 2.80     |
| 2016 | 10   | 1.60          | 24.23               | 3.19     |
| 2010 | 11   | 1.45          | 24.33               | 3.19     |
| 2017 | 12   | 1.33          | 28.09               | 3.34     |
| 2015 | 13   | 1.23          | 31.64               | 3.45     |
| 2014 | 14   | 1.14          | 32.76               | 3.49     |
| 2011 | 15   | 1.07          | 92.43               | 4.53     |

## June



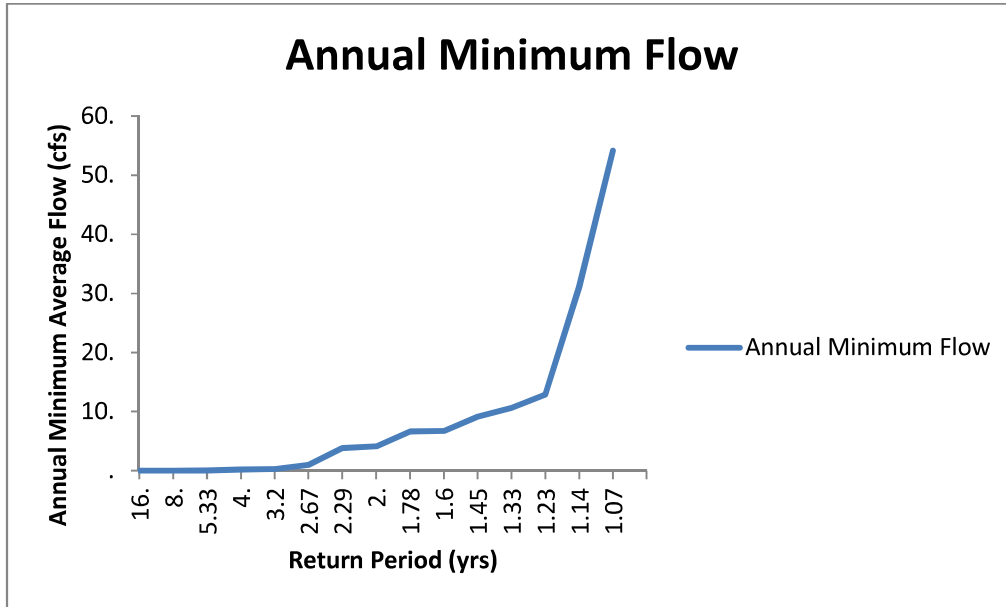
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2006 | 1    | 16.00         | 0.13                | -2.06    |
| 2007 | 2    | 8.00          | 0.43                | -0.85    |
| 2004 | 3    | 5.33          | 0.88                | -0.12    |
| 2012 | 4    | 4.00          | 2.86                | 1.05     |
| 2016 | 5    | 3.20          | 6.04                | 1.80     |
| 2003 | 6    | 2.67          | 8.38                | 2.13     |
| 2009 | 7    | 2.29          | 14.70               | 2.69     |
| 2005 | 8    | 2.00          | 14.86               | 2.70     |
| 2017 | 9    | 1.78          | 18.10               | 2.90     |
| 2013 | 10   | 1.60          | 22.26               | 3.10     |
| 2014 | 11   | 1.45          | 28.10               | 3.34     |
| 2008 | 12   | 1.33          | 36.83               | 3.61     |
| 2011 | 13   | 1.23          | 91.83               | 4.52     |
| 2010 | 14   | 1.14          | 110.51              | 4.71     |
| 2015 | 15   | 1.07          | 458.43              | 6.13     |

## July



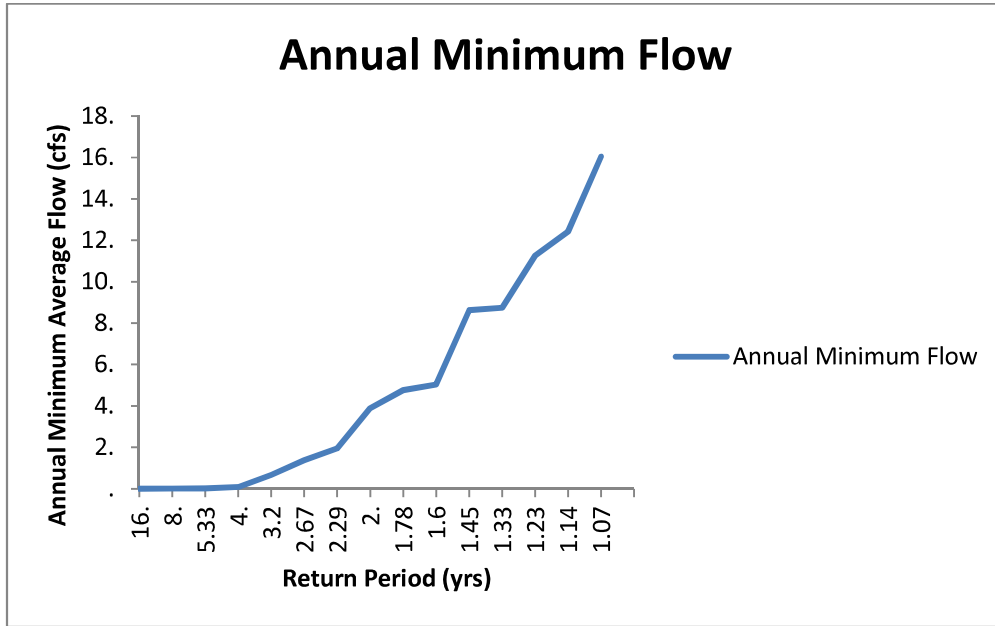
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2006 | 1    | 16.00         | 0.00                | -13.82   |
| 2004 | 2    | 8.00          | 0.00                | -6.55    |
| 2007 | 3    | 5.33          | 0.12                | -2.13    |
| 2012 | 4    | 4.00          | 0.50                | -0.69    |
| 2003 | 5    | 3.20          | 0.79                | -0.24    |
| 2005 | 6    | 2.67          | 1.73                | 0.55     |
| 2016 | 7    | 2.29          | 5.70                | 1.74     |
| 2017 | 8    | 2.00          | 6.15                | 1.82     |
| 2009 | 9    | 1.78          | 7.67                | 2.04     |
| 2013 | 10   | 1.60          | 9.35                | 2.23     |
| 2014 | 11   | 1.45          | 10.85               | 2.38     |
| 2011 | 12   | 1.33          | 19.83               | 2.99     |
| 2008 | 13   | 1.23          | 21.61               | 3.07     |
| 2010 | 14   | 1.14          | 41.17               | 3.72     |
| 2015 | 15   | 1.07          | 97.27               | 4.58     |

## August



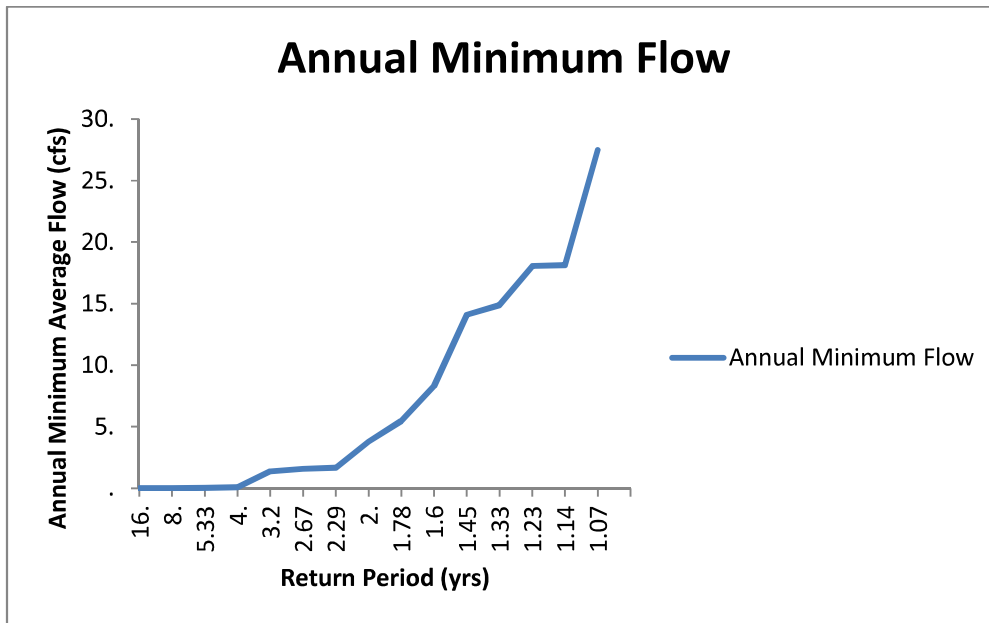
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2004 | 1    | 16.00         | 0.00                | -13.82   |
| 2006 | 2    | 8.00          | 0.00                | -5.86    |
| 2007 | 3    | 5.33          | 0.01                | -4.61    |
| 2012 | 4    | 4.00          | 0.19                | -1.65    |
| 2003 | 5    | 3.20          | 0.26                | -1.36    |
| 2005 | 6    | 2.67          | 0.96                | -0.04    |
| 2009 | 7    | 2.29          | 3.81                | 1.34     |
| 2008 | 8    | 2.00          | 4.10                | 1.41     |
| 2017 | 9    | 1.78          | 6.62                | 1.89     |
| 2010 | 10   | 1.60          | 6.70                | 1.90     |
| 2016 | 11   | 1.45          | 9.13                | 2.21     |
| 2014 | 12   | 1.33          | 10.63               | 2.36     |
| 2011 | 13   | 1.23          | 12.86               | 2.55     |
| 2013 | 14   | 1.14          | 31.09               | 3.44     |
| 2015 | 15   | 1.07          | 54.17               | 3.99     |

## September



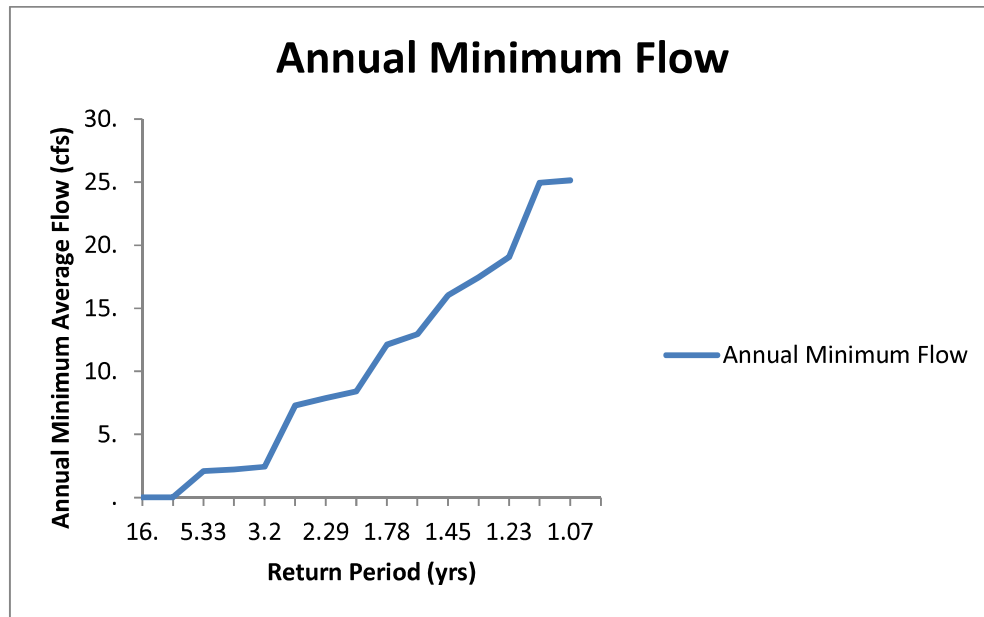
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2004 | 1    | 16.00         | 0.00                | -13.82   |
| 2007 | 2    | 8.00          | 0.01                | -4.94    |
| 2006 | 3    | 5.33          | 0.02                | -3.91    |
| 2012 | 4    | 4.00          | 0.08                | -2.47    |
| 2003 | 5    | 3.20          | 0.67                | -0.40    |
| 2009 | 6    | 2.67          | 1.38                | 0.32     |
| 2008 | 7    | 2.29          | 1.95                | 0.67     |
| 2017 | 8    | 2.00          | 3.89                | 1.36     |
| 2010 | 9    | 1.78          | 4.77                | 1.56     |
| 2005 | 10   | 1.60          | 5.04                | 1.62     |
| 2016 | 11   | 1.45          | 8.63                | 2.16     |
| 2013 | 12   | 1.33          | 8.74                | 2.17     |
| 2011 | 13   | 1.23          | 11.26               | 2.42     |
| 2014 | 14   | 1.14          | 12.43               | 2.52     |
| 2015 | 15   | 1.07          | 16.04               | 2.78     |

## October



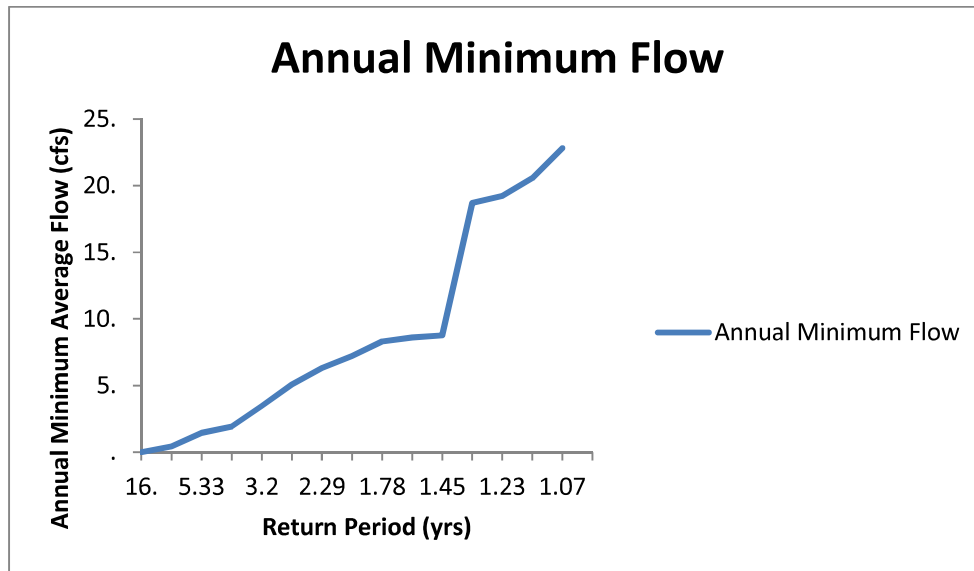
| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2004 | 1    | 16.00         | 0.00                | -13.82   |
| 2007 | 2    | 8.00          | 0.00                | -13.82   |
| 2006 | 3    | 5.33          | 0.02                | -3.91    |
| 2012 | 4    | 4.00          | 0.08                | -2.54    |
| 2009 | 5    | 3.20          | 1.37                | 0.32     |
| 2008 | 6    | 2.67          | 1.58                | 0.45     |
| 2003 | 7    | 2.29          | 1.66                | 0.51     |
| 2010 | 8    | 2.00          | 3.80                | 1.33     |
| 2005 | 9    | 1.78          | 5.47                | 1.70     |
| 2013 | 10   | 1.60          | 8.31                | 2.12     |
| 2011 | 11   | 1.45          | 14.1                | 2.65     |
| 2017 | 12   | 1.33          | 14.89               | 2.70     |
| 2016 | 13   | 1.23          | 18.06               | 2.89     |
| 2015 | 14   | 1.14          | 18.11               | 2.90     |
| 2014 | 15   | 1.07          | 27.49               | 3.31     |

## November



| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2007 | 1    | 16.00         | 0.01                | -4.61    |
| 2006 | 2    | 8.00          | 0.02                | -3.91    |
| 2008 | 3    | 5.33          | 2.08                | 0.73     |
| 2004 | 4    | 4.00          | 2.23                | 0.80     |
| 2005 | 5    | 3.20          | 2.44                | 0.89     |
| 2003 | 6    | 2.67          | 7.30                | 1.99     |
| 2009 | 7    | 2.29          | 7.88                | 2.06     |
| 2010 | 8    | 2.00          | 8.41                | 2.13     |
| 2012 | 9    | 1.78          | 12.11               | 2.49     |
| 2014 | 10   | 1.60          | 12.94               | 2.56     |
| 2017 | 11   | 1.45          | 16.01               | 2.77     |
| 2011 | 12   | 1.33          | 17.46               | 2.86     |
| 2016 | 13   | 1.23          | 19.07               | 2.95     |
| 2015 | 14   | 1.14          | 24.96               | 3.22     |
| 2013 | 15   | 1.07          | 25.15               | 3.22     |

## December



| Year | Rank | Return Period | Annual Minimum Flow | Log Flow |
|------|------|---------------|---------------------|----------|
| 2007 | 1    | 16.00         | 0.00                | -13.82   |
| 2016 | 2    | 8.00          | 0.43                | -0.83    |
| 2005 | 3    | 5.33          | 1.46                | 0.38     |
| 2008 | 4    | 4.00          | 1.93                | 0.66     |
| 2017 | 5    | 3.20          | 3.46                | 1.24     |
| 2006 | 6    | 2.67          | 5.07                | 1.62     |
| 2009 | 7    | 2.29          | 6.31                | 1.84     |
| 2012 | 8    | 2.00          | 7.21                | 1.98     |
| 2004 | 9    | 1.78          | 8.31                | 2.12     |
| 2010 | 10   | 1.60          | 8.61                | 2.15     |
| 2003 | 11   | 1.45          | 8.77                | 2.17     |
| 2011 | 12   | 1.33          | 18.71               | 2.93     |
| 2014 | 13   | 1.23          | 19.23               | 2.96     |
| 2013 | 14   | 1.14          | 20.57               | 3.02     |
| 2015 | 15   | 1.07          | 22.81               | 3.13     |

## Appendix D



State of Utah

GARY R. HERBERT  
Governor

SPENCER J. COX  
Lieutenant Governor

Department of  
Environmental Quality

Alan Matheson  
Executive Director

DIVISION OF WASTE MANAGEMENT  
AND RADIATION CONTROL

Scott T. Anderson  
Director

April 26, 2016



Binesh Tharakan  
U.S. NRC Region IV  
Division of Nuclear Materials Safety  
1600E. Lamar Blvd  
Arlington, TX 76011-4511

RE: Transportation Incident at the White Mesa Mill Involving an 11e.(2) Shipment

Dear Mr. Tharakan:

On March 29, 2016, Energy Fuels Resources Inc.'s (EFRI) White Mesa Uranium Mill contacted the Division of Waste Management and Radiation Control to report a leaking shipment of 11e.(2) material that had arrived at its facility. The Radiation Safety Officer of the Mill described the material as a white paste like substance. The 11e.(2) shipment originated from the Cameco-Smith Ranch facility (a Nuclear Regulatory Commission (NRC) licensed facility) in Wyoming and was sent to the Mill to be disposed in the Mill's tailings cells.

The Mill's radiation safety staff documented the leak with photographs, radiological surveys and a written description. Documentation of the leak indicates that 11e.(2) material leaked onto the transport container, the transport conveyance and U.S. Highway 191 near the Mill. During transport, a winter storm with rain and snow went through Wyoming, Colorado and Utah when this incident occurred (March 28 and 29, 2016). Therefore, there is a high probability that any road contamination would have been washed away and making it impossible to determine when the leaking of the transport began.

A further description of the incident from EFRI dated April 4, 2016, including radiological survey results, is enclosed.

The following regulations are applicable to this incident:


1. 49 CFR 173.427(c)(1) – *Transportation requirements for low specific activity (LSA) Class 7 (radioactive) material and surface contaminated objects (SCO).*

(Over)

DRC-2016-006043

195 North 1950 West • Salt Lake City, UT  
Mailing Address: P.O. Box 144880 • Salt Lake City, UT 84114-4880  
Telephone (801) 536-0200 • Fax (801) 536-0222 • T.D.D. (801) 903-3978  
[www.deq.utah.gov](http://www.deq.utah.gov)  
Printed on 100% recycled paper

---

 Number: 1    Author: vrobin03    Subject: Sticky Note    Date: 2/19/2020 2:42:23 PM -07'00'

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## Appendix D

April 2016 Letter from UT DEQ Div of Waste Management and Radiation Control to the NRC Region IV office about transportation incident at the White Mesa Mil involving an 11e.(2) shipment

2. 49 CFR 173.443 - *Contamination control*
3. 10 CFR 71.43(f) - *General standards for all packages*
4. 10 CFR 71.71 - *Normal conditions of transport*

Contrary to 49 CFR 173.427(c)(1), 10 CFR 71.43(f) and 10 CFR 71.71, the Cameco-Smith Ranch Facility sent an 11e.(2) shipment to the White Mesa Mill in a roll-off container that did not contain the material under routine (normal) conditions of transport.

Contrary to 49 CFR 173.443, leakage from that container resulted in removable contamination on the outside of the container that exceeded DOT contamination limits for Alpha and an exterior dose rate greater than 0.5 mrem per hour.

This is the second incident of this type that has been reported to the Division with the first being reported on August 21, 2015. The Division requests that NRC take appropriate regulatory action with Cameco-Smith Ranch to prevent recurrence. Please find enclosed the EFRI report of the incident, photographs and shipping papers.

If you have any questions, please call Ryan Johnson at (801) 536-4255.

Sincerely,



Scott T. Anderson, Director  
Division of Waste Management and Radiation Control

STA/RMJ/ka

Enclosures: Documentation Letter, dated April 4, 2016 (DRC-2016-006042)  
Cameco Smith Ranch Shipping Paperwork (DRC-2016-006041)  
Photographs (DRC-2016-006044)  
Email from Ryan Johnson, dated March 29, 2016 (DRC-2016-006045)

c: Worthy Glover, Jr., MMHRM, CPM, Health Office San Juan Public Health Department  
Rick Meyer, Environmental Health Director, San Juan Public Health Department  
David Ariotti, P.E., DEQ District Engineer  
Ms. Linda Gersey, U.S. NRC Region IV, Division of Nuclear Materials Safety  
Ryan S. Schierman, State of Wyoming, Wyoming Department of Environmental Quality,  
Natural Resources Program Manager  
Jennifer Opila, Colorado Department of Public Health & the Environment, Hazardous Materials  
& Waste Management Division, Radiation Program, Program Manager



Energy Fuels Resources (USA) Inc.  
225 Union Blvd. Suite 600  
Lakewood, CO, US, 80228  
303 974 2140  
[www.energyfuels.com](http://www.energyfuels.com)

---

April 4, 2016

**Sent VIA E-MAIL AND EXPRESS DELIVERY**

Mr. Scott Anderson  
Director  
Division of Waste Management and Radiation Control  
Utah Department of Environmental Quality  
195 North 1950 West  
P.O. Box 144880  
Salt Lake City, UT 84114-4820

**Re: Transmittal of Documentation for Follow-up to Notifications Provided to the Division of Waste Management and Radiation Control ("DWMRC") for White Mesa Uranium Mill**

Dear Mr. Anderson:

Attachment 1 to this letter provides Energy Fuels Resources USA Inc.'s ("EFRI's") follow-up documentation to previous notifications to DWMRC Personnel by David Turk on March 29, 2016 regarding Cameco 11e.(2) shipping issues.

Department of Transportation ("DOT") regulations in 49 CFR 171.15 require that persons in physical possession of a material during an incident provide notifications to DOT after the occurrence of any incident. Pursuant to this requirement, Greenfield Logistics made the appropriate notifications to U.S. DOT National Response Center on March 29, 2016.

If you should have any questions regarding this submittal please contact me at 303-389-4134.

Yours very truly, <sup>c</sup>

ENERGY FUELS RESOURCES (USA) INC.  
Kathy Weinel  
Quality Assurance Manager

CC: David Frydenlund  
Harold Roberts  
David Turk  
Logan Shumway  
Scott Bakken

**ATTACHMENT 1**

## **DOCUMENTATION FOR INCIDENT OF MARCH 29, 2016**

### **Name of Reporter to DWMRC**

Verbal Notification was provided to the Division of Waste Management and Radiation Control ("DWMRC") by David Turk White Mesa Mill Radiation Safety Officer ("RSO")

Initial written notification via e-mail was provided by David Turk White Mesa Mill RSO

This follow-up notification is provided by Kathy Weinel, EFRI Quality Assurance Manager ("QAM")

Notifications were provided to Mr. Phil Goble and Mr. Ryan Johnson of DWMRC on March 29, 2016.

### **Name and Address of Person Represented by Reporters**

Energy Fuels Resources USA Inc.

225 Union Boulevard, Suite 600

Lakewood, Colorado 80228

For an incident located near:

White Mesa Mill

6425 South Highway 191

Blanding Utah, 84511

### **Phone Numbers Where Reporters Can Be Contacted**

David Turk 435-678-4113

Kathy Weinel 303-389-4134

### **Date, Time, and Location of Incident**

At approximately 0730 hours on Tuesday March 29, 2016, the staff at the White Mesa Mill (the "Mill") noted that an incoming Intermodal Container ("IMC") from Cameco - Smith Ranch was leaking a white paste like material. The IMC had traveled from the Cameco Smith-Ranch Facility in Glenrock, Wyoming overland to the Mill entrance in Blanding, Utah.

The incident involved a leaking 11e.(2) disposal shipment from Cameco - Smith Ranch in the Mill entry way. In addition, some material had spilled out of the container onto US Highway 191.

### **The Extent of the Injury**

No injuries resulted from this incident.

### **Class or Division, Proper Shipping Name and Quantity of Hazardous Materials Involved**

The leaked material is Class 7, UN2912, Radioactive Material, Low Specific Activity (LSA-1).

It is estimated that less than 5 gallons was present at the entrance to the Mill and on the truck and IMC.

### **Type of Incident and Nature of Hazardous Material Involvement and Whether a Continuing Danger to Life Exists at the Scene**

The incident involved an IMC that was leaking a small amount of material. Some material had dripped from the truck and contacted the highway. The majority of the leaked material remained affixed to the IMC and transport truck. The leaking material was identified as Class 7, UN2912, Radioactive Material, Low Specific Activity (LSA-1).

At no time during the incident was there a danger to life.

The materials which were noted on the Highway 191 surfaces, as well as those on Mill property, were cleaned up following the incident by Mill Personnel.

#### Chronology of the Incident

- At approximately 0730 hours on Tuesday March 29, 2016, the staff at the Mill noted that an incoming IMC from Cameco - Smith Ranch was leaking a white paste like material. The IMC and truck were denied entry to the Mill facility pending investigation and approval from DWMRC.
- The RSO was notified. The RSO immediately examined the container and truck and took photographs.
- The RSO contacted Mr. Phil Goble with the State of Utah Division Of Waste Management and Radiation Control at approximately 0800 hours. The notification to Mr. Goble, included notice that a leaking 11e.(2) disposal shipment from Cameco – Smith Ranch arrived at the Mill and was sitting in the Mill entry way. Mr. Goble was also notified that there was white material that had spilled out of the container onto US Highway 191 near the entrance to the Mill property.
- After notification was given to the DWMRC, the RSO made contact with EFRI Corporate Staff. Ms. Kathy Weinel was notified via phone at approximately 0830 hours. Photographs were sent to EFRI Corporate Staff via text messaging.
- Ms. Weinel phoned the site RSO for Cameco Smith Ranch, a Mr. Travis Coleman. Mr. Coleman was not in the office and a voicemail was left.
- Ms. Weinel then contacted the Mine Manager, Mr. Craig Hiser to report the spill. This was the first notice to Mr. Hiser of an issue with the shipment as Greenfield Logistics, the shipping company, had not yet notified Smith Ranch Personnel of the incident.
- The RSO returned to the inbound shipment and took multiple photographs of the tractor, trailer and IMC and began a radiological survey of the material that was visible on US Highway 191 and EFRI entrance road.
- The white material on the asphalt highway and roadway ranged from 5,850 to 9,360 dpm/100cm<sup>2</sup> for alpha and 0.04 to 0.08 mrem/hr beta/gamma.
- There were four removable alpha swipes taken on the asphalt roadways. Those readings came back at 383 to 492.5 dpm/100cm<sup>2</sup>.
- During the radiological survey, the RSO was contacted by the Greenfield Logistics dispatcher, Mr. Chris Hartley, to make sure that we were aware of the leaking container. He was told that EFRI was aware of the situation and that EFRI was in the process of gathering information and data for the report to DWMRC. Mr. Hartley was also notified that the container would not be released, because the container would need to be fully cleaned before allowing it to leave the facility. Due to the deteriorating weather conditions the cleaning process for that container was not possible at that time.
- The Mill Personnel went to the conveyance and performed a radiological survey on all components where there was visible material. The material came back with a total alpha measurement of between 35,100 to 58,500 dpm/100cm<sup>2</sup>. The beta/gamma survey on the same material was 5.0 mrem/hr. A series of removable alpha swipes were collected. Those readings ranged from the lowest on the tires at 438.8 dpm/100cm<sup>2</sup> to the highest on the beam under the potential source at 2,551.3 dpm/100cm<sup>2</sup>.
- The RSO spoke with the Greenfield driver, Mr. Doug Angell. He stated that he noticed the leaking container when he pulled onto our entrance way at 2330 hours on Monday March 28, 2016. He stated he then texted his dispatcher at that time about the leak. He also stated that on Monday March 28, 2016, while traveling near Meeker, Colorado, a deer ran in front of the truck and he had to hit the brakes hard. That was the only time during the trip that there was any sudden jarring of the load. He stated that he had filled up with fuel in Rawlins, Wyoming and, at that time, there was no leakage. It should be noted that all seals were still intact that Cameco installed prior to the container leaving their site.

- At approximately 0945 hours on Tuesday March 29, 2016, the RSO allowed the load onto the property pursuant to approval from DWMRC Personnel. The main reason for the allowing the truck and IMC onto the Mill property was that rain was starting to fall and washing some of the material off of the container and onto the ground. In order to prevent a larger cleanup, the decision was made to move the truck and IMC to the Mill Restricted Area.
- The area on US Highway 191 and the EFRI entrance way was washed and any contaminated soil (approximately 5 to 6 cubic yards) was excavated and taken into the Mill Restricted Area and then out to Cell 3 for disposal. The cleanup area extended approximately ¼ of a mile north on US Highway 191. The area was surveyed after the rain/snow storm stopped. Data from these scans is summarized below.

#### Summary of Scan Results

| <b>Location</b>        | <b>Background Units</b>                     | <b>Pre-Cleanup Results Units</b>              | <b>Post-Cleanup Results Units</b>        |
|------------------------|---|---|--|
| EFRI Entrance Road     | 212 dpm/100cm <sup>2</sup> and 10 µR/hr     | 5,850 dpm/100cm <sup>2</sup> and 0.04 mrem/hr | ≤ Bkg and 23 µR/hr                       |
| US Highway 191 turnout | 212 dpm/100cm <sup>2</sup> and 10 µR/hr     | 9,360 dpm/100cm <sup>2</sup> and 0.08 mrem/hr | ≤ Bkg and 20 µR/hr                       |
| US Highway 191         | 212 dpm/100cm <sup>2</sup> and 10 µR/hr     | 5,850 dpm/100cm <sup>2</sup> and 0.04 mrem/hr | ≤ Bkg and 10 µR/hr                       |
| Greenfield Truck       | 212 dpm/100cm <sup>2</sup> and 0.04 mrem/hr | 35,100 dpm/100cm <sup>2</sup> and 5.0 mrem/hr | ≤ Bkg and ≤ 0.04 mrem/hr                 |
| Greenfield IMC         | 212 dpm/100cm <sup>2</sup> and 0.04 mrem/hr | 58,500 dpm/100cm <sup>2</sup> and 5.0 mrem/hr | Is still in the process of being cleaned |

- The inbound IMC was dumped on Cell 3 and the then moved to the vicinity of the Old Decontamination pad in order for EFRI to perform a detailed decontamination of the unit once conditions improve. The truck was taken through the Old Decontamination wash station. The truck was released from the site at 1130 hours. All release surveys on the truck met applicable standards.
- At approximately 1830 hours on March 29, 2016, Greenfield Logistics reported the incident to DOT National Response Center. Kevin Williams at the National Response Center took the call and issued Case # 1144028. Shane Johnson of Greenfield Logistics received a call from DOT to review the details of the report. Per e-mail communications from Greenfield Logistics, DOT considers the incident report closed.
- At approximately 0900 hours on March 30, 2016, Ms. Weinel spoke with Mr. Travis Coleman. Mr. Coleman was notified that this was the second incident of this type involving this material. EFRI recommended Smith-Ranch Personnel conduct an internal investigation into this incident to prevent recurrence.
- The US. Nuclear Regulatory Commission ("NRC") requested that Cameco retrace the route of the shipment to investigate the potential for additional released material. The Cameco team obtained a detailed account of the route. In the event that additional released material was identified, Cameco's Emergency Response contractor was standing by to respond.
- On April 1, 2016 a Cameco team comprised of the Smith Ranch RSO, Mr. Travis Coleman, a Smith Ranch Health Physics Technician ("HPT"), Mr. Chris Pendleton, and Mr. Ken Vaughn, the Cameco Director of Communications traveled to the Mill in Blanding Utah. They arrived at 1830 on Friday, April 1, 2016.
- The Cameco team surveyed Highway 191 from the Mill entrance to the 4-way intersection in Blanding in ¼ mile increments. No readings above background were noted.
- On April 2, 2016, the Cameco team retraced the shipping route and surveyed at points along the road. Additional data were collected in and around Meeker, Colorado due to the Greenfield

driver stating he had to stop quickly to avoid a deer in that area. Due to the potential for additional spillage, this area was surveyed at a higher frequency.

- Photographs are included on the CD attached to the hardcopy of this notice.

#### **Conclusion**

After final decontamination of the IMC to appropriate release standards, the IMC will be released. No further cleanup activities at the Mill, on Highway 191, or the travel way are required. EFRI has requested that Cameco Smith-Ranch personnel complete an investigation of the cause of this incident and take appropriate actions to prevent recurrence in the future. Cameco Resources has suspended all waste shipments from Smith Ranch-Highland and Crow Butte until the issue(s) that resulted in the incident are fully addressed. Cameco's investigation will address both the type of material and method of shipment (regarding no free liquid).

# STRAIGHT BILL OF LADING

## ORIGINAL-NOT NEGOTIABLE

Shipper No. 31107

Carrier No. \_\_\_\_\_

Date 3/28/16

Greenfield Logistics  
(Name of Carrier) (SCAC)

|   |  |   |  |
|---|--|---|--|
| on Collect on Delivery shipments, the letters COD must appear before consignee's name or as otherwise provided in Item 430, Sec. 1.<br><b>To: Consignee</b> <u>Energy Fuels</u><br><b>Street</b> <u>6425 South HWY 191</u><br><b>City</b> <u>Blanding</u> <b>State</b> <u>UT</u> <b>Zip Code</b> <u>84511</u> |  | <b>From: Shipper</b> <u>CAMECO RESOURCES, INC.</u><br><b>Street:</b> <u>762 Ross Rd</u><br><b>City</b> <u>Douglas</u> <b>State</b> <u>WY</u> <b>Zip Code</b> <u>82633</u><br><b>24 hr. Emergency Contact Tel. No:</b> <u>905-885-8745</u> |  |
|---|--|---|--|

| Route :                       |    |   |   | Vehicle:<br>Number                |      |                                   |
|-------------------------------|----|---|---|-----------------------------------|------|-----------------------------------|
| No. of units & container type | HM | Basic Description<br>Proper Shipping Name, Hazard Class, Identification Number (UN or NA), Packing Group, per 172.101, 172.202, 172.203   | Total Quantity<br>(Weight, Volume, Gallons, etc.) | Weight<br>(Subject to Correction) | RATE | Charges<br>(For Carrier Use Only) |
| 1 Roll off                    | XX | UN2912, RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1), CLASS 7<br>RADIONUCLIDE: RESIDUAL NATURAL URANIUM & ASSOCIATED DAUGHTER PRODUCTS<br>PHYSICAL FORM: SOLID<br>CHEMICAL FORM: NATURAL URANIUM OXIDE UO <sub>2</sub> ·2H <sub>2</sub> O<br>TOTAL ACTIVITY: 1.83E9Bq (.05Ci)<br>TRANSPORT INDEX: N/A AS PER 49CFR172.203(d)(5)<br>PLACARDS: RADIOACTIVE 7<br>EXCLUSIVE USE SHIPMENT: THIS VEHICLE IS ASSIGNED FOR EXCLUSIVE USE OF CAMECO RESOURCES, INC. UNDER PROVISIONS OF 49 CFR 173.427 INCLUDING EXEMPTING FROM MARKING AND LABELING REQUIREMENTS<br>DO NOT LOAD OTHER FREIGHT IN THIS VEHICLE, TRANSFER EN ROUTE | 9.9m <sup>3</sup> (13yd <sup>3</sup> )            |                                   |      |                                   |

PLACARDS TENDERED: YES ☒ X NO ☐

REMIT C.O.D. TO:  
ADDRESS

Note: (1) Where the rate is dependent on value, shippers are required to state specifically on writing the agreed or declared value of the property, as follows: The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding \_\_\_\_\_ per \_\_\_\_\_  
 (2) Where the applicable tariff provisions specify a limitation of the carrier's liability absent a release or a value declaration by the shipper and the shipper does not release the carrier's liability or declare a value, the carrier's liability shall be limited to the extent provided by such provisions. See HMPL Item 172.  
 (3) Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation. See Section 2(a) of Item 300, Bills of Lading, Freight Bills, and Statements of Charges and Section 1(a) of the Contract terms and conditions for a list of such articles.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked, and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.  
 ON BEHALF OF SHIPPER  
[Signature]  
 Signature

COD Amt: \$ \_\_\_\_\_  
 Subject to Section 7 of the conditions of this shipment to be delivered to the consignee without recourse on the consignee, the consignor shall sign the following statement:  
 The consignor shall not make delivery of this shipment without payment of freight and all other lawful charges.  
 \_\_\_\_\_  
 (Signature of Consignee)

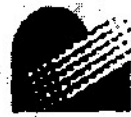
C.O.D. FEE:  
PREPAID ☐ COLLECT ☐  
 TOTAL CHARGES: \$ \_\_\_\_\_  
 FREIGHT CHARGES  
 FREIGHT PREPAID ☐ Freight when bill is right to consignor  
 Check box if charges are to be collect

RECEIVED, subject to the classifications and tariffs to effect on the date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents or packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of this property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of the shipment.  
 Shipper hereby certifies that he is familiar with all the lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

|   |                                     |   |                            |
|---|-------------------------------------|---|----------------------------|
| <b>SHIPPER:</b> <u>CAMECO RESOURCES, INC.</u> |                                     | <b>CARRIER:</b> <u>Greenfield Logistics</u> |                            |
| <b>PER</b> <u>[Signature]</u>                 | <b>PER</b> <u>Douglas B. Angell</u> | <b>DATE</b> <u>3/28/16</u>                  | <b>DATE</b> <u>3/28/16</u> |

DATE 3/15/16  
 CONTAINER # 6FLN-1560  
 LOCATION Selenium Plant  
 TOTAL YARDS 13 yd

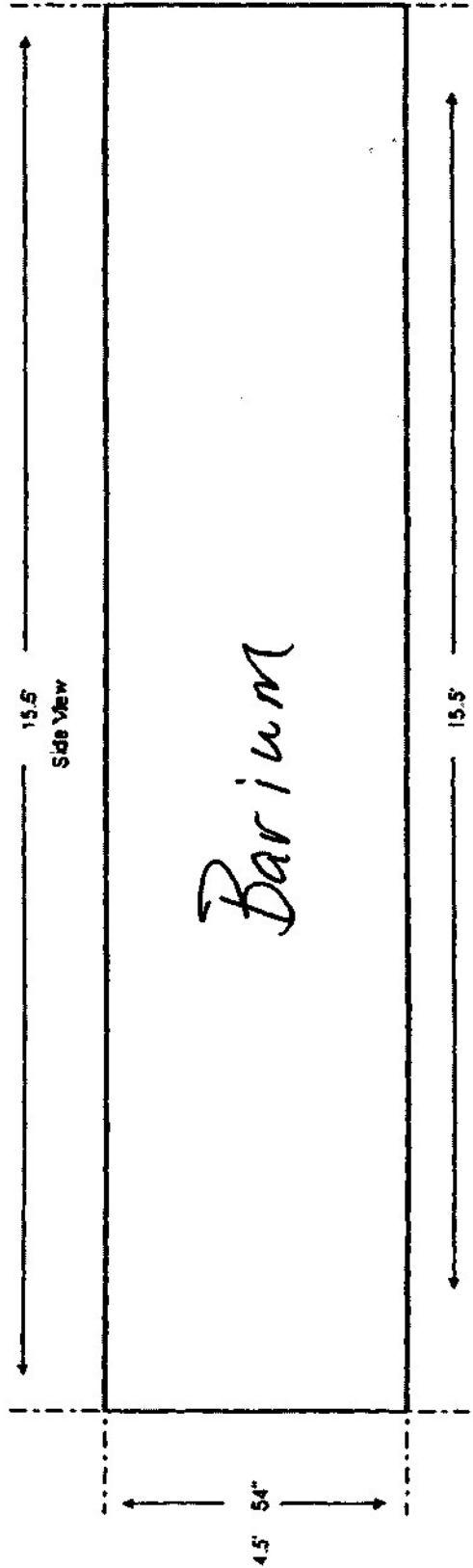
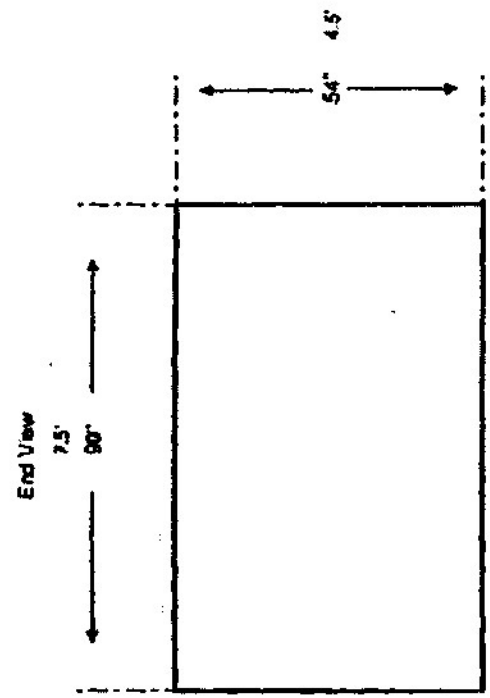
*Sales*  
*0061151*  
*151167*



**POWER RESOURCES**  
 (dba, Carmeco Resources)

**VOLUME PER VERTICAL FOOT**

|               |             |
|---------------|-------------|
| Yards per in. | 1" = 0.38   |
| Yards per Ft. | 1' = 4.31   |
|               | 2' = 8.61   |
|               | 3' = 12.92  |
|               | 3.5' = 15.1 |
|               | 4' = 17.22  |
| Full          | 19.38       |



**Power Resources**  
 Smith Ranch - Highland Uranium Project  
 By-product container Cubic Yard Calculation



**RELEASE AUTHORIZATION FOR BY-PRODUCT MATERIAL**

(Complies with D. O. T. Hazardous Material Regulations, 49 CFR Parts 100-199)

SHIPPER: Cameco Resources  
Smith Ranch Highland Operation  
762 Ross Road  
Douglas, WY 82633  
License No. SUA-1548

**CAMECO RESOURCES**  
Smith Ranch-Highland  
Operation

Mail:  
P.O. Box 1210  
Glenrock, WY  
82637 USA

Tel: (307) 358-6541  
Fax: (307) 358-4533  
www.cameco.com

RECEIVER: Energy Fuels  
6425 S. Hwy 191  
Blanding, Utah 84511  
License No. UT1900479 Amendment #4

SHIPPING DATE: 3/28/16  
SRH SHIPMENT #: 3/16-8  
TOTAL MAXIMUM ACTIVITY OF LOAD: 1.83E9 (0.05C)

**CONTENTS:**

- ☒ UN 2912, Radioactive Material, Low Specific Activity (LSA-1), Class 7 Shipment contains by-product material from an in-situ uranium mine.
- ☐ RQ, UN 2912, Radioactive Material, Low Specific Activity (LSA-1), Class 7 Shipment contains by-product material from an in-situ uranium mine.
- ☐ UN 2913, Radioactive Material, Surface Contaminated Objects (SCO-1), Class 7 Shipment contains by-product material from an in-situ uranium mine.
- ☐ RQ, UN 2913, Radioactive Material, Surface Contaminated Objects (SCO-1), Class 7 Shipment contains by-product material from an in-situ uranium mine.

By execution below, it is represented that the byproduct material being transported is properly classified, described, loaded and labeled; and, that the byproduct material is completely contained and in proper condition for transportation, according to the applicable regulations for the state and federal transportation departments.

The shipper certifies the byproduct material is not listed hazardous waste as defined in the Resource Conservation and Recovery Act, as amended, 40 CFR 261 et. seq. or comparable state laws. The byproduct material has not been mixed or commingled with hazardous waste as defined in 40 CFR 261 et. seq.. No processes are operated on the site which is RCRA-listed processes as defined in 40 CFR 261 et. seq. All of the Byproduct Material is byproduct material as defined under Section 11(e)(2) of the Atomic Energy Act of 1954 as amended, 42 U.S.C. §2014(e)(2) and 10 CFR §40.4(a-i). The chemical analysis as listed in Paragraph 2(C) of the Byproduct Disposal Agreement dated June 1, 2010 has been completed for this shipment.

DATE: 3/28/16

BY: Craig Thorne

## DRIVER RESPONSIBILITY STATEMENT

I, Douglas B. Angell, driver for Greenfield logistics

have read and understand the Driver Instructions including Emergency Procedures provided by Cameco Resources. It is understood that I will be responsible for proper care and handling of all materials in the trucks and/or trailers under my jurisdiction.

DATE: 3/28/11

SIGNATURE: Douglas B. Angell



Cameco Resources

# WYOMING OPERATIONS BYPRODUCT MATERIAL SHIPMENT TRUCK SURVEY

|                                 |   |
|---------------------------------|---|
| METER MODEL <u>3</u>            | SHIPMENT NO. <u>3116-P</u>                  |
| METER SN <u>229617</u>          | LOCATION: <u>Selenium Plant</u>             |
| CALIBRATION DATE <u>5/11/15</u> | DATE: <u>3/28/16</u>                        |
|                                 | RSO/RST <u>[Signature]</u>                  |
|                                 | SIGNATURE                                   |
| METER MODEL <u>3</u>            | BACKGROUND <u>0.05</u> mR/hr                |
| METER SN <u>235586</u>          | BACKGROUND <u>0</u> dmp/100 cm <sup>2</sup> |
| CALIBRATION DATE <u>2/9/16</u>  |   |

Swipe Survey Yes

mR/hr 0.09  
Driver's Seat

425 dpm/100 cm<sup>2</sup>  
Surface

0.5 mR/hr 5.0  
6.6' (2 meters) Surface

425 dpm/100 cm<sup>2</sup>

## Quality Control Checklist (49CFR 173.475)

As Per SHEQ Management System Volume IV-Transportation  
 The container is in good condition? ✓  
 The container has been closed properly? ✓  
 The container has been filled properly? ✓  
 Exterior contamination/ Radiation levels below the limits? ✓

Green Field  
CARRIER NAME

3  
TRACTOR NO.

1560

4.0 mR/hr 0.5  
Surface 6.6' (2 Meters)

5.0 mR/hr 0.6  
Surface 6.6' (2 Meters)

283 dpm/100 cm<sup>2</sup>

## Limits

Gamma = 200 mR/hr at surface  
 Gamma = 10 mR/hr at 2 meters  
 Gamma = 2 mR/hr in cab  
 Alpha = 1000 dpm/100cm<sup>2</sup> for swipe survey  
 Alpha = 2200 dpm/100 cm<sup>2</sup> for instrument survey

0.4 mR/hr 3.0  
6.6' (2 Meters) Surface

708 dpm/100 cm<sup>2</sup>  
Surface



**WYOMING OPERATIONS  
SHEQ MANAGEMENT SYSTEM  
EMERGENCY PROCEDURES MANUAL  
VOLUME VIII**

## **Transportation Accident Response Guide (Instructions to the Driver)**

### **I.) Introduction**

Transportation accidents during the shipment of radioactive concentrates from uranium recovery facilities (yellowcake, brine, resin, byproduct, or slurry) occur infrequently on public highways and at trucking terminals. This material is classified by DOT as Radioactive (Class 7) material. Leakage or spillage of the contents from its container can be a potential health hazard to persons if they ingest or inhale the materials.

The purpose of this guideline is to provide direction for persons responding to a shipping accident involving radioactive materials, particularly when the contents have leaked from their containers. Leakage or spillage can range in severity depending on the specific accident conditions. Although this guideline addresses the worst-case situation, lesser response activities are envisioned for less severe accidents.

The guideline provides instructions to the driver and to other persons who are the first to arrive at the accident scene. These instructions request notifications be made to the shipper and the carrier. If warranted, the shipper will dispatch an initial response team to assist with accident investigation and response. The shipper will also alert a clean-up crew for possible duty and provide guidance for securing clean-up equipment and services. Clean-up methods, monitoring, sampling, release levels, and concluding activities are also described.

You are advised per these instructions to transport the items defined on the attached shipping documents under "EXCLUSIVE USE" provisions.

"EXCLUSIVE USE" (also referred to as "Sole Use" of "Full Load" as used in IAEA regulations) means any shipment:

- From a single consignor having the exclusive use of a transport vehicle or of an aircraft, or of a hold or compartment of an inland watercraft, or of a hold, compartment, or defined deck area of a seagoing vessel; and

- For which all initial, intermediate, and final loading and unloading is carried out by or under the direction of the consignor, consignee, or his designated agent.

|  |                      |           |                                |                                    |
|--|----------------------|-----------|--------------------------------|------------------------------------|
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|--|----------------------|-----------|--------------------------------|------------------------------------|

## Transportation Accident Response Guide (Instructions to the Driver)

Special remarks concerning exclusive use:

- DO NOT transfer the shipment from the originating carrier vehicle.
- DO NOT load other packages on the originating carrier vehicle.
- Deliver the shipment directly to consignee.
- Special routing may be required per attachment.

## Transportation Accident Response Guide (Instructions to the Driver)

### 2.) Emergency Response Procedures Provided to Carrier

#### ***TO WHOM IT MAY CONCERN:***

- Rescue and lifesaving may be conducted with minimal potential hazards from the cargo on this truck. If possible, avoid breathing dust from spilled cargo. **DO NOT DELAY RESCUE EFFORTS!**
- After needed rescue, lifesaving, first aid or fire fighting, please read the attached instructions in the event of cargo spillage.
- Please note that this truck is equipped with emergency equipment. It is accessible in the storage area on the neck of the trailer or is \_\_\_\_\_ (write in location if not located in the trailer neck storage area).

***TO THE DRIVER: Keep these emergency procedures with your shipping papers, along with Emergency Information For Carriers Form and Guide 162 Radioactive Materials ERG 2012.***

This vehicle contains radioactive materials, which may be in the form of dry uranium oxide (yellowcake, U3O8), yellowcake, brine, resin, slurry, or byproduct (waste) material. The color of concentrated material is yellow. The slurry is a liquid material containing solid yellowcake. The material cannot burn or explode. *In the event of an accident involving spillage of material, the following actions are recommended in the order given if appropriate:*

#### ***1. Lifesaving, Rescue, and Firefighting***

This may be done with minimal potential hazards from the material. If possible, avoid breathing and/or swallowing yellowcake dust, slurry, or byproduct material. The radioactive material on the skin or clothing is relatively harmless and simple washing methods will remove it.

If you believe you may have been contaminated with the material, please remove any contaminated clothing and place in plastic bag, use soap and water to wash contaminates

|  |                      |           |                                |                                    |
|--|----------------------|-----------|--------------------------------|------------------------------------|
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|--|----------------------|-----------|--------------------------------|------------------------------------|

from hands or exposed area, and notify the Cameco Resources Emergency Response Team (CR ERT) upon their arrival at the accident site. To avoid ingestion of the material, do not eat, drink, or smoke while near the spill.

## **Transportation Accident Response Guide (Instructions to the Driver)**

### **2.     *Contact the Local Law Enforcement Agency***

Tell the police of the accident with spillage of "LOW SPECIFIC ACTIVITY" (LSA) radioactive material called "yellowcake", "slurry" or "byproduct material". Ask them to notify the state health department. Give them the location of the accident site and tell them of any injured persons.

Nebraska State Police:                   (308) 632-1211 or (402) 471-4545

Wyoming State Police:                 1-800-442-9090

Colorado State Police:               (303) 239-4500  
(Emergency Dispatch – 24 hours)   (303) 239-4501

Utah Highway Patrol:                 (801) 965-4518

### **3.     *Cover the Spilled Material***

This vehicle carries a spill kit containing gloves, disposable coveralls, shoe covers, radioactive material signs, approved dust respirators with instructions, plastic sheeting, stakes, nails, a hammer, and a knife. Put on coveralls, respirator, gloves, and shoe covers, then cover the spilled material with the plastic. Secure the edges of the plastic to the ground using the stakes, or to the vehicle floor, etc., using the nails. The radioactive material signs should be positioned to provide notice to bystanders.

Unnecessary personnel should be instructed to stand upwind of the spill and 150 feet or more from it. Undamaged containers lying on the road may be moved to the side of the road. Caution: Full drums of yellowcake are very heavy, usually weighing in excess of 500 pounds for slurry and 800 pounds for dry product.

### **4.     *Fill Out the Attached Questionnaire***

Please obtain all of the information requested on the attached form that you can. Please relay this information to the carrier and the shipper listed below. See the final pages of these instructions for additional emergency phone numbers.

|  |                      |           |                                |                                    |
|--|----------------------|-----------|--------------------------------|------------------------------------|
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## Transportation Accident Response Guide (Instructions to the Driver)

### 5. *Telephone the Carrier and the Shipper (Call Collect)*

- The carrier is:

---

- The shipper is:

Carneco Resources  
Douglas, Wyoming  
(307) 358-6541  
After hours  
(307) 358-6541 ext. 450

The Carneco Resources phone in the Central Plant (ext. 450) is manned 24-hours per day, 7-days per week. Please read the completed questionnaire to whoever answers your call. If necessary for their understanding, read the questionnaire a second time.

### 6. *When Help Arrives*

Cooperate with all civil authorities and carrier and shipper personnel who arrive at the scene. Follow their health-safety instructions on checking for possible contamination of your clothing or body.

Please be assured that your exposure to this material will be relatively harmless if you have followed these instructions. The radiological safety personnel who will arrive will be glad to answer any questions you have about this matter.

Thank you very much.

## Transportation Accident Response Guide (Instructions to the Driver)

### 3.) Accident Evaluation Guide

1. Name of Trucking Company: \_\_\_\_\_
2. Truck Number or Tag No: \_\_\_\_\_
3. Name of Driver: \_\_\_\_\_
4. Name of Police Department Notified: \_\_\_\_\_
5. Phone Number of Police Notified: \_\_\_\_\_
6. Place of Accident: \_\_\_\_\_
7. Is the Driver Injured? \_\_\_\_\_
8. Other Injured? \_\_\_\_\_
9. Bill of Lading Number: \_\_\_\_\_
10. Destination of Shipment: \_\_\_\_\_
11. Time of Accident: \_\_\_\_\_
12. Was There a Fire? \_\_\_\_\_
13. Is It Raining or Was Water Used to Put Out Fire or Wash Off Road? \_\_\_\_\_
14. Are Drums Outside of the Truck? \_\_\_\_\_
15. About How Many? \_\_\_\_\_
16. Are Contents of Drums or Tanks Spilled? \_\_\_\_\_
17. Has the Spill Been Covered? \_\_\_\_\_
18. Is the Spill on the Ground? \_\_\_\_\_
19. Is the Spill in Water? \_\_\_\_\_ Lake? \_\_\_\_\_ Stream? \_\_\_\_\_
20. Is the Spill Near a Building? \_\_\_\_\_
21. Is the Accident Area Lighted at Night? \_\_\_\_\_
22. Name of Nearest Large City? \_\_\_\_\_
23. Other Comments: \_\_\_\_\_
24. Your Name Please \_\_\_\_\_
  - a. Can You Be Reached By Phone Near the Accident Site? \_\_\_\_\_
  - b. Phone number: \_\_\_\_\_
  - c. Home or Business Phone: \_\_\_\_\_
  - d. Your Address: \_\_\_\_\_

Date: \_\_\_\_\_

## **Transportation Accident Response Guide (Instructions to the Driver)**

**Shipper Notification – Cameco Resources Personnel – call in order listed until one is reached)**

### **Mine Management**

|    |  | <b>Work Phone</b>      | <b>Home Phone</b>              |
|----|--|------------------------|--------------------------------|
| 1. | Craig Hiser<br>Mine Manager  | (307)358-6541 ext. 415 | (307)436-8727                  |
| 2. | Travis Coleman<br>RSO  | (307)358-6541 ext. 431 | (208)589-3870                  |
| 3. | Ken Garoutte–<br>Safety, Health,<br>Environment and Quality Manager      | (307)358-6541 ext. 476 | (307)337-3383                  |
| 4. | Smith Ranch Central Plant Operator<br>24 hours per day / 7 days per week | (307)358-6541 ext. 450 | (307)259-3659<br>(307)473-2432 |

### **North Butte Operations**

|    |                            |                        |               |
|----|----------------------------|------------------------|---------------|
| 5. | Erik Heide<br>Mine Manager | (307)358-6541 ext. 456 | (307)259-3659 |
|----|----------------------------|------------------------|---------------|

### **Casper Management**

|    |                                  | <b>Work Phone</b> | <b>Home Phone</b> |
|----|----------------------------------|-------------------|-------------------|
| 1. | Brent Berg<br>President          | (307)333-7735     | (307)337-1775     |
| 2. | Mike Thomas<br>SHEQ Manager- DIV | (307)333-7665     | (307)277-2751     |

# Transportation Accident Response Guide (Instructions to the Driver)

## Emergency Response Telephone Number Guide

### State Agencies

### Telephone No.

#### Colorado:

State Police - Denver

(303) 239-4500

Health Department (24 hours)

(877) 518-5608

#### Illinois:

Highway Patrol General Headquarters

Deputy Director

(217) 557-6630

Crash Report #

(217) 785-0614

#### Iowa:

State Patrol Headquarters (Des Moines)

(515) 725-6090

Calls made after 4:30pm will automatically transfer to 911

#### Kansas:

Highway Patrol General Headquarters

(785) 296-6800

After hours: Dial \*47 for highway help

Dial \*582 for turnpike help

#### Michigan:

Highway Headquarters

(517) 241-8000

(24 hours)

#### Minnesota:

Highway Patrol

(651) 201-7100

Dept. of Transportation-Admin. Office

#### Missouri:

General Headquarters

(573) 751-3313

## **Transportation Accident Response Guide (Instructions to the Driver)**

### **Emergency Response Telephone Number Guide**

#### **State Agencies**

#### **Telephone No.**

##### Nebraska:

|   |                |
|---|----------------|
| Highway Patrol - Scottsbluff, NE.                   | (308) 632-1211 |
| Lincoln, NE.  | (402) 471-4545 |
| Health and Human Services (8 a.m. - 5 p.m. Central) | (402) 471-2168 |
| (After Business Hours - Call Hwy. Patrol - Lincoln) | (402) 471-4545 |
| NDEQ (8 a.m. - 5 p.m. Central)                      | (402) 471-2186 |
| (After Business Hours - Call Hwy. Patrol - Lincoln) | (402) 471-4545 |

##### South Dakota:

|                       |                |
|-----------------------|----------------|
| Division Headquarters | (605) 773-3105 |
|-----------------------|----------------|

##### Utah:

|   |                |
|---|----------------|
| Highway Patrol - Price, UT. (Section 9) | (801) 965-4532 |
| Division of Radiation Control (24 hour) | (801) 536-4123 |

##### Wisconsin:

|                                    |                |
|------------------------------------|----------------|
| State Patrol Division Headquarters | (608) 266-3212 |
|------------------------------------|----------------|

##### Wyoming:

|   |                |
|---|----------------|
| State Highway Police                            | 1-800-442-9090 |
| WDEQ (24 hour)                                  | (307) 777-7781 |
| Wyo. Emergency Mgmt. Agency (Homeland Security) | (307) 777-4900 |
| Wyoming Department of Transportation            | (307) 777-4484 |

## **Transportation Accident Response Guide (Instructions to the Driver)**

#### **Federal & Canadian Agencies**

#### **Telephone No.**

##### **Nuclear Regulatory Commission**

|                                   |  |
|-----------------------------------|--|
| Operations Center - Bethesda, Md. | (301) 816-5100 or<br>(301) 951-0550 or<br>(301) 415-0550 |
|-----------------------------------|--|

##### **Department of Transportation -**

|                          |                                     |
|--------------------------|-------------------------------------|
| National Response Center | (800) 424-8802 or<br>(202) 267-2675 |
|--------------------------|-------------------------------------|

##### **Ontario:**

|                              |                |
|------------------------------|----------------|
| Provincial Police (24 hours) | (888) 310-1122 |
|------------------------------|----------------|

# ON-SITE Transportation Accident Response Guide For Pulling Unit Operators

## 1.) Introduction

Transportation accidents during the transport of radioactive concentrates from uranium recovery facilities (byproduct, or wellfield equipment that will be stored and reused) occur infrequently on public highways. This material is classified by DOT as radioactive material shipped as excepted package or Surface Contaminated Object SCO-1. Leakage or spillage of the contents from its container can be a potential health hazard to persons if they ingest or inhale the materials.

The purpose of this guideline is to provide direction for persons responding to a shipping accident involving radioactive materials, particularly when the contents have leaked from their containers. Leakage or spillage can range in severity depending on the specific accident conditions.

The guideline provides instructions to the driver and to other persons who are the first to arrive at the accident scene. These instructions request notifications be made to the shipper and the carrier. If warranted, the shipper will dispatch an initial response team to assist with accident investigation and response. The shipper will also alert a clean-up crew for possible duty and provide guidance for securing clean-up equipment and services.

### ***TO WHOM IT MAY CONCERN:***

- Rescue and lifesaving may be conducted with minimal potential hazards from the cargo on this truck. If possible, avoid breathing dust from spilled cargo. **DO NOT DELAY RESCUE EFFORTS!**
- After needed rescue, lifesaving, first aid or firefighting, please read the attached instructions in the event of cargo spillage.

### ***Lifesaving, Rescue, and Firefighting***

This may be done with minimal potential hazards from the material. If possible, avoid breathing and/or swallowing material that may be adhered to byproduct material or wellfield equipment. The radioactive material on the skin or clothing is relatively harmless and simple washing methods will remove it. If you believe you may have been contaminated with the material, please notify first responders upon their arrival at the accident site. To avoid ingestion of the material, do not eat, drink, or smoke while near the spill.

|  |                      |            |                                |                                    |
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This vehicle contains radioactive materials, which may be in the form of natural uranium and associated daughter products. The color of the material may be red/orange or white/yellow. The material cannot burn or explode. *In the event of an accident involving spillage of material, the following actions are recommended in the order given if appropriate:*

### ***Contact Supervisor***

Contact your supervisor and give them the location of the accident site and tell them of any injured persons. The supervisor will communicate with the SHEQ Department and the RSO or their designees. Depending on the severity of the situation the Emergency Response Team may also be initiated.

### ***Initial response***

In the event of spilled radioactive materials, clean-up methods, monitoring, sampling and release levels will be performed under the direction of the RSO or designee. Additional requirements may also be applicable as per SHEQ Management System volume VIII.

|  |                      |            |                                |                                    |
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Cameco Resources

## WYOMING OPERATIONS EMERGENCY INFORMATION FOR CARRIERS

Approvals

Operations:

Project RSO:

Revision Date:

T. Coleman  
1/7/2016

### THIS VEHICLE CONTAINS: (CHECK THE APPROPRIATE DESCRIPTION OF THE CARGO)

- ☐ URANIUM ORE CONCENTRATE ( $U_3O_8$  or Yellowcake). The color may be black, greenish brown or yellow, with a dry granular to powdery texture.
- ☒ SOLID WASTE BYPRODUCT MATERIAL FROM THE PROCESSING OF URANIUM-  
Material may vary from white sludge to contaminated pipe, pumps and assorted trash.
- ☐ ION EXCHANGE RESIN CONTAINING ADSORBED URANIUM ON RESIN SURFACE

### IN THE EVENT OF AN ACCIDENT INVOLVING SPILLAGE THE FOLLOWING ACTIONS ARE RECOMMENDED:

#### 1. LIFESAVING

- A. USE FIRST AID TREATMENT- according to the nature of the injury.
- B. RADIOACTIVE MATERIAL- degree of hazard will vary from little to moderate.
- C. AVOID SWALLOWING OR BREATHING DUST. DO NOT EAT, DRINK OR SMOKE NEAR THE SPILL
- D. LOW LEVEL RADIOACTIVE MATERIAL ON THE SKIN OR CLOTHING IS RELATIVELY HARMLESS
- E. REMOVE AND ISOLATE SUSPECTED CONTAMINATED CLOTHING AND SHOES AS SOON AS POSSIBLE AND WASH AFFECTED SKIN AREAS WITH SOAP AND WATER - DO NOT EAT, DRINK OR SMOKE UNTIL FREE OF CONTAMINATION.

#### 2. FIRE FIGHTING

- A. DO NOT MOVE DAMAGED CONTAINERS; MOVE UNDAMAGED CONTAINERS OUT OF THE FIRE ZONE
- B. **SMALL FIRES:** DRY CHEMICAL,  $CO_2$ , WATER SPRAY OR REGULAR FOAM.
- C. **LARGE FIRES:** WATER SPRAY, FOG OR REGULAR FOAM.

#### 3. SPILL OR LEAK

- A. **DO NOT TOUCH DAMAGED CONTAINERS OR SPILLED MATERIAL.**
- B. COVER DRY (POWDER) SPILL WITH PLASTIC SHEET OR TARP, TO MINIMIZE SPREADING
- C. **ISOLATE AREA OF SPILL**
- D. KEEP UNNECESSARY PEOPLE AT LEAST 150 FEET UPWIND OF SPILL; GREATER DISTANCES FOR PEOPLE DOWNWIND



Cameco Resources

## WYOMING OPERATIONS EMERGENCY INFORMATION FOR CARRIERS

### NOTIFICATIONS

1. **NOTIFY LOCAL LAW ENFORCEMENT AGENCY GIVING THEM SPECIFIC DETAILS REGARDING THE ACCIDENT AND REQUEST THEY NOTIFY THE STATE HEALTH DEPARTMENT AND TELL THEM CARGO IS:**
  - ☐ URANIUM ORE CONCENTRATE ( $U_3O_8$  OR YELLOWCAKE). "LOW SPECIFIC ACTIVITY" (LSA) RADIOACTIVE MATERIAL
  - ☒ SOLID WASTE BYPRODUCT MATERIAL FROM THE PROCESSING OF URANIUM "LOW SPECIFIC ACTIVITY" (LSA) RADIOACTIVE MATERIAL OR SURFACE CONTAMINATED OBJECT (SCO-1)
  - ☐ ION EXCHANGE RESIN CONTAINING ABSORBED URANIUM ON RESIN SURFACE "LOW SPECIFIC ACTIVITY (LSA-1) RADIOACTIVE MATERIAL
2. **NOTIFY ONE OF THE FOLLOWING CAMECO RESOURCES PERSONNEL AT (307) 358-6541 DURING BUSINESS HOURS OR CALL IN THE ORDER LISTED UNTIL ONE IS REACHED.**

|                       |                                 |                                     |
|-----------------------|---------------------------------|-------------------------------------|
| <b>TRAVIS COLEMAN</b> | <b>RADIATION SAFETY OFFICER</b> | <b>OFFICE (307)358-6541 ext.431</b> |
| <b>KEN GAROUTTE</b>   | <b>SHEQ MANAGER</b>             | <b>HOME (307)337-3383</b>           |
| <b>CRAIG HISER</b>    | <b>MINE MANAGER</b>             | <b>HOME (307)436-8727</b>           |

# GUIDE 162 RADIOACTIVE MATERIALS (Low to Moderate Level Radiation)

NAERG-66

## POTENTIAL HAZARDS

### HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel, and the public during transportation accidents. Packaging durability is related to potential hazards of material.
- Undamaged packages are safe; contents of damaged packages may cause external and/or internal radiation exposure.
- Low radiation hazard when material is inside container. If material is released from package or bulk container, hazard will vary from low to moderate. Level of hazard will depend on the type and amount of radioactivity, the kind of material it is in, and/or the surfaces it is on.
- Some material may be released from packages during accidents of moderate severity. This poses little risk to people.
- Released radioactive materials or contaminated objects usually will be visible if packaging fails.
- Some exclusive use shipments of bulk and packaged materials will not have "RADIOACTIVE" labels.
- Placards, markings, and shipping papers provide identification.
- Some packages may have a "RADIOACTIVE" label and a second hazard label. The second hazard is usually greater than the radiation hazard; so follow this Guide as well as the response Guide for the second hazard class label.
- Some radioactive materials cannot be detected by commonly available instruments.
- Runoff from control of cargo fire may cause low-level pollution.

### FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Uranium and Thorium metal cuttings or granules may ignite spontaneously if exposed to air (see Guide 136).
- Nitrates are oxidizers and may ignite other combustibles (see Guide 141).

## PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first aid, and control of fire and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions, and is usually responsible for radiological decisions.
- Isolate spill or leak area immediately for at least 25 to 50 meters (50 to 150 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

## PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection.

## EVACUATION

- Large Spill
- Consider initial downwind evacuation for at least 100 meters (330 feet).
- Fire
- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

NAERG-66

# GUIDE 162 RADIOACTIVE MATERIALS (Low to Moderate Level Radiation)

## EMERGENCY RESPONSE

### FIRE

- Presence of radioactive material will not change effectiveness of fire control techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

### Small Fires

- Dry chemical, CO<sub>2</sub>, water spray or regular foam.
- Large Fires
- Water spray, fog (flooding amounts).
- Dike fire-control water for later disposal.

### SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Liquid Spills
- Cover with sand, earth or other noncombustible absorbent material.
- Dike to collect large liquid spills.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

### FIRST AID

- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Apply artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Injured persons who contacted released material may be a minor contamination problem to contacted persons, equipment and facilities.
- Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.



# Safety Data Sheet

## Uranium Peroxide Hydrate

### 1. Product and company identification

**Product name** : Uranium Peroxide Hydrate

**Common name** :  $\text{UO}_4$ , peroxide yellowcake, yellowcake, peroxide uranium ore concentrate, uranyl peroxide

**Material uses** : Concentrate produced from the milling of the uranium ore for processing at a refinery

**MSDS #** : Cameco 141 E

**Supplier/Manufacturer** : Rabbit Lake Operation  
c/o Cameco Corporation  
2121 11<sup>th</sup> Street West  
Saskatoon, Saskatchewan  
Canada S7M1J3

Cameco Resources  
Crow Butte Operation  
86 Crow Butte Road  
Crawford, NE 69339  
USA

Cameco Resources  
Smith Ranch Highland  
P.O. Box 1210  
Glenrock, WY 82637  
USA

Tel: (306) 633 2141  
Fax: (306) 633 2248

Tel: (308) 665-1393  
Fax: (308) 665-2341

Tel: (307) 358 6541  
Fax: (307) 358 4533

**MSDS authored by** : KMK Regulatory Services Inc.

**In case of emergency** : 1 905 885 8745

### 2. Hazards identification

#### Emergency overview

**Physical state** : Solid (Powder)

**Color** : Yellow

**Odor** : No odor

#### GHS Label Elements

**Pictogram** :



**Signal word** : DANGER

**Hazard statements** : Toxic by inhalation and ingestion  
Danger of cumulative effects  
May damage kidneys

**Precautionary measures** : Do not breathe dust. Do not ingest. Do not get on skin or clothing. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes. Keep container closed. Wash thoroughly after handling.

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

**Routes of entry** : Dermal contact, via cuts abrasion or open wounds. Eye contact. Inhalation. Ingestion.

**Potential acute health effects**

- Inhalation : Harmful if inhaled. Kidney damage can occur due to chemical toxicity. Dissolution half-time of  $\text{UO}_4 \cdot x\text{H}_2\text{O}$  is fast for the synthetic lung fluid solubility test. Dust inhalation can result in an internal dose from alpha, beta and gamma radiation.
- Ingestion : Harmful if swallowed. Kidney damage can occur due to chemical toxicity.
- Skin : Skin dermatitis may result from skin contact.
- Eyes : Irritating to eyes.

**Potential chronic health effects**

- Chronic effects : May cause target organ damage, based on animal data. Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
- Carcinogenicity : Not listed as a carcinogenic material by IARC or OSHA. Soluble and insoluble compounds of uranium are listed as potential occupational carcinogens by NIOSH, and confirmed human carcinogens by ACGIH, based on evidence from epidemiological studies.
- Mutagenicity : No known significant effects or critical hazards.
- Teratogenicity : No known significant effects or critical hazards.
- Developmental effects : No known significant effects or critical hazards.
- Fertility effects : No known significant effects or critical hazards.
- Target organs : May cause damage to following organs: kidneys

**Over-exposure signs/symptoms**

- Inhalation : Adverse symptoms may include the following:  
respiratory tract irritation, coughing
- Ingestion : Chemical toxicity is largely shown in kidney damage that may not be reversible
- Skin : Prolonged contact can result in dermatitis
- Eyes : Adverse symptoms may include the following:  
pain or irritation  
watering  
redness
- Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

**3. Composition/information on ingredients****United States**

| Name                     | CAS number | %   |
|--------------------------|------------|-----|
| Uranium Peroxide Hydrate | 19525-15-6 | >95 |

**Canada**

| Name                     | CAS number | %   |
|--------------------------|------------|-----|
| Uranium Peroxide Hydrate | 19525-15-6 | >95 |

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health of the environment and hence require reporting in this section.

**4. First aid measures**

- Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.

|                                   |   |
|-----------------------------------|---|
| <b>Skin contact</b>               | : In case of contact, immediately flush skin with plenty of water for at least 20 minutes.  |
| <b>Inhalation</b>                 | : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention immediately.  |
| <b>Ingestion</b>                  | : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical doctor or poison control center immediately.  |
| <b>Protection of first-aiders</b> | : No action shall be taken involving any personal risk or without suitable training. If it is suspected that dust is present, it may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Rescuer should wear an appropriate mask or self-contained breathing apparatus. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. |
| <b>Notes to physician</b>         | : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.  |

## 5. Fire-fighting measures

|                                    |                 |
|------------------------------------|-----------------|
| <b>Flammability of the product</b> | : Not flammable |
|------------------------------------|-----------------|

### Extinguishing media

|   |  |
|---|--|
| <b>Suitable</b>                                       | : CO <sub>2</sub> , dry chemical, foam, alcohol-type foam, water fog   |
| <b>Not suitable</b>                                   | : None known.  |
| <b>Special exposure hazards</b>                       | : Possible presence of radioactive uranium dust. No action shall be taken involving any personal risk or without suitable training.  |
| <b>Hazardous thermal decomposition products</b>       | : Uranium peroxide hydrate decomposes to produce uranium trioxide (UO <sub>3</sub> ) powder and oxygen (O <sub>2</sub> ) gas at high temperatures. Steam will be generated from water of hydration.  |
| <b>Special protective equipment for fire-fighters</b> | : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-shield operated in positive pressure mode.   |
| <b>Special remarks on fire hazards</b>                | : Uranium peroxide hydrate decomposes to produce uranium trioxide (UO <sub>3</sub> ) powder and oxygen (O <sub>2</sub> ) gas at high temperatures. The O <sub>2</sub> gas will increase the explosive limit range and rate of burning for flammable and combustible materials in the vicinity. |

## 6. Accidental release measures

|                                  |  |
|----------------------------------|--|
| <b>Personal precautions</b>      | : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).   |
| <b>Environmental precautions</b> | : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers by covering with a suitable cover. Drums of the material are to be shipped to the nearest Cameco Corporation facility or other licensed repository that can handle the material. Forward any contaminated clothing or equipment in separate marked drums. Inform the relevant authorities if the product has caused environmental pollution in sewers, waterways soil or air. |

### Methods for cleaning up

|                    |  |
|--------------------|--|
| <b>Small Spill</b> | : Move containers from spill area. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: See Section 1 for emergency contact information and Section 13 for waste disposal. |
|--------------------|--|

**Large Spill** : Move containers from spill area. Cover suitably to prevent dispersal by wind and precipitation. Prevent entry into sewers, water courses, basements or confined areas. Approach release from upwind. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: See Section 1 for emergency contact information and Section 13 for waste disposal.

## 7. Handling and storage

**Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not get in eyes or on skin or clothing. Do not breathe dust. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. In extremely rare occurrences, sealed drums of uranium peroxide can become pressurized with oxygen gas from decomposition. If signs of pressurization are observed (bulging lids and/or bottoms), do not handle the drums until they are evaluated by qualified uranium fuel cycle personnel who will determine safe handling procedures.

**Storage** : Uranium peroxide concentrates is shipped from the uranium mill to the refinery in a 200 L sealed steel drum. Store in accordance with radiation protection regulations in sealed containers. Store in original container away from extreme heat, incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. In extremely rare occurrences, sealed drums of uranium peroxide can become pressurized with oxygen gas from decomposition. If signs of pressurization are observed (bulging lids and/or bottoms), do not handle the drums until they are evaluated by qualified uranium fuel cycle personnel who will determine safe handling procedures.

## 8. Exposure controls/personal protection

### United States

| Ingredient               | Exposure limits                   |   |
|--------------------------|-----------------------------------|---|
| Uranium peroxide hydrate | ACGIH TLV (United States, 3/2012) | TWA: 0.2 mg/m <sup>3</sup> , (as U) 8 hours<br>STEL: 0.6 mg/m <sup>3</sup> , (as U) 15 minutes  |
|                          | OSHA PEL (United States, 6/2010)  | TWA: 0.25 mg/m <sup>3</sup> , (as U) 8 hours  |
|                          | NIOSH REL (United States, 6/2009) | TWA: 0.2 mg/m <sup>3</sup> , (as U) 10 hours<br>STEL: 0.6 mg/m <sup>3</sup> , (as U) 15 minutes |

### Canada

| Occupational exposure limits   |                 | TWA (8 hours) |                   |       | STEL (15 mins) |                   |       | Ceiling |                   |       | Notations |
|--------------------------------|-----------------|---------------|-------------------|-------|----------------|-------------------|-------|---------|-------------------|-------|-----------|
| Ingredient                     | List name       | ppm           | mg/m <sup>3</sup> | Other | ppm            | mg/m <sup>3</sup> | Other | ppm     | mg/m <sup>3</sup> | Other |           |
| Uranium peroxide hydrate, as U | US ACGIH 3/2012 |               | 0.2               |       |                | 0.6               |       |         |                   |       |           |
|                                | AB 4/2009       |               | 0.2               |       |                | 0.6               |       |         |                   |       |           |
|                                | BC 4/2012       |               | 0.2               |       |                | 0.6               |       |         |                   |       |           |
|                                | ON 7/2010       |               | 0.2               |       |                | 0.6               |       |         |                   |       |           |
|                                | QC 9/2011       |               | 0.2               |       |                | 0.6               |       |         |                   |       |           |

Consult local authorities for acceptable exposure limits.

- |                                   |   |   |
|-----------------------------------|---|---|
| Recommended monitoring procedures | : | If this product contains ingredients with exposure limits, personal, workplace, atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required. |
| Engineering measures              | : | Use only with adequate ventilation. Use process enclosures or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. This may require HEPA filtration of exhaust air.   |
| Hygiene measures                  | : | Wash hands, forearms and face thoroughly after handling, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. Contamination monitoring may be required for activities with direct exposure.                       |

#### Personal protection

- |                                 |   |  |
|---------------------------------|---|--|
| Respiratory                     | : | Use a properly fitted particulate filter respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.  |
| Hands                           | : | Chemical resistant impervious gloves complying with an approved standard should be worn at all times when handling. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining the protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. Recommended : Rubber or neoprene for normal industrial use |
| Eyes                            | : | Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles   |
| Skin                            | : | Personal protective equipment for body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: long sleeved coveralls  |
| Environmental exposure controls | : | Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.   |

#### 9. Physical and chemical properties

- |                           |   |                |
|---------------------------|---|----------------|
| Physical state            | : | Solid (Powder) |
| Flash point               | : | Not applicable |
| Burning time              | : | Not applicable |
| Burning rate              | : | Not applicable |
| Auto-ignition temperature | : | Not applicable |
| Flammable limits          | : | Not applicable |
| Color                     | : | Yellow         |
| Odor                      | : | Odorless       |
| Taste                     | : | Not applicable |

|                                       |  |
|---------------------------------------|--|
| Molecular weight                      | : 338 g/mole   |
| Molecular formula                     | : $\text{UO}_4 \cdot 2\text{H}_2\text{O}$                  |
| pH                                    | : Not applicable   |
| Boiling/condensation point            | : Decomposes   |
| Melting/freezing point                | : Decomposition temperature: 160 to 230 °C (320 to 446 °F) |
| Critical temperature                  | : Not applicable   |
| Specific Gravity                      | : 4 to 4.4   |
| Vapor pressure                        | : Not applicable   |
| Volatility                            | : Not applicable   |
| Odor threshold                        | : Not applicable   |
| Evaporation rate                      | : Not applicable   |
| SADT                                  | : Not applicable   |
| Viscosity                             | : Not applicable   |
| Ionicity (in water)                   | : Not applicable   |
| Dispersibility properties             | : Not applicable   |
| Solubility                            | : Negligible   |
| Partition coefficient (log $K_{ow}$ ) | : Not applicable   |
| Physical/chemical properties comments | : Not applicable   |

## 10. Stability and reactivity

|                                    |   |
|------------------------------------|---|
| Chemical stability                 | : The product is stable under normal* conditions.<br>* Normal conditions in an operating environment: pressure 0.9 bar to 1.1 bar, oxygen 21% v/v, temperature from 0 to 30 °C  |
| Conditions to avoid                | : Avoid extremely high temperatures.  |
| Incompatible materials             | : Strong mineral acids such as nitric, sulphuric or hydrochloric acids.   |
| Hazardous decomposition products   | : Under normal conditions of storage and use, hazardous decomposition products should not be produced. Uranium peroxide hydrate decomposes to produce uranium trioxide ( $\text{UO}_3$ ) powder and oxygen ( $\text{O}_2$ ) gas at temperatures at high temperatures. |
| Possibility of hazardous reactions | : Under normal conditions of storage and use, hazardous reactions will not occur.   |

## 11. Toxicological information

### Acute toxicity

Uranium is a nephrotoxin ( a kidney poison). Studies indicate that long term exposure may result in kidney impairment. While an  $\text{LD}_{50}$  of 70 mg/kg has been estimated for soluble uranium salts[ Kathren and Burklin (2008)], but insoluble uranium compounds were found to be practically non-toxic, indicating  $\text{LD}_{50}$  for insoluble salts such as uranium peroxide hydrate should be much higher.

### Chronic toxicity

There is no data available

### Irritation/Corrosion

Skin : There is no data available

Eyes : There is no data available

Respiratory : There is no data available

### Sensitizer

Skin : There is no data available

Respiratory : There is no data available

### Carcinogenicity

#### Classification

| Product/ingredient name  | ACGIH | IARC | EPA | NIOSH | NTP | OSHA |
|--------------------------|-------|------|-----|-------|-----|------|
| Uranium peroxide hydrate | A1    | -    | -   | +     | -   | -    |

### Mutagenicity

There is some evidence of genetic effects from radiation in animal studies, however there has been no evidence reported in human studies.

### Teratogenicity

There is no data available

### Reproductive toxicity

There is limited available data on the reproductive toxicity in humans.

IDLH : 10 mg U/m<sup>3</sup>

## 12. Ecological information

Ecotoxicity :

### Aquatic ecotoxicity

Green algae LOEC 70-170 µg/L; mussels EC<sub>50</sub> 380- 600 µg/L (Warne et al. 2009)

### Persistence/degradability

Sediments act as sinks for insoluble uranium compounds.

## 13. Disposal considerations






**Waste disposal** : Scrap uranium peroxide hydrate should be recycled through an appropriate licenced facility. Contaminated uranium peroxide hydrate must be disposed of as radioactive waste, rather than as hazardous chemical waste. It is recommended to consult local state and federal regulations and Cameco corporation to determine appropriate disposal routes for uranium peroxide hydrate waste.

Disposal should be in accordance with applicable national, regional and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and SECTION 8. EXPOSURE CONTROL/PERSONAL PROTECTION for additional handling information and protection of employees.

## 14. Transport information

| Regulatory information | UN number | Proper shipping name | Classes | PG* | Label | Additional information |
|------------------------|-----------|----------------------|---------|-----|-------|------------------------|
|------------------------|-----------|----------------------|---------|-----|-------|------------------------|

|                    |        |   |   |   |  |                                    |
|--------------------|--------|---|---|---|--|------------------------------------|
| DOT Classification | UN2912 | RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) (non fissile or fissile excepted) | 7 | - |   |                                    |
| TDG Classification | UN2912 | RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) (non fissile or fissile excepted) | 7 | - |   |                                    |
| IMDG Class         | UN2912 | RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) (non fissile or fissile excepted) | 7 | - | <br> | Emergency schedules (EmS) F-1, S-S |
| IATA-DGR Class     | UN2912 | RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-1) (non fissile or fissile excepted) | 7 | - |   |                                    |

PG\*: Packing group

Exemptions to the above classification may apply. AERG : 162

## 15. Regulatory information

### United States

|   |  |
|---|--|
| HCS Classification  | : Toxic material<br>Carcinogen<br>Target organ effects   |
| U.S. Federal regulations                                      | : TSCA 8(a) CDR Exempt/Partial exemption: Not determined<br>United States inventory (TSCA8b): Not determined |
| Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) | : Not listed   |
| Clean Air Act Section 602 Class I Substances                  | : Not listed   |
| DEA List II Chemicals (Precursor Chemicals)                   | : Not listed   |
| DEA List II Chemicals (Essential Chemicals)                   | : Not listed   |

### SARA 302/304

### Composition/information on ingredients

No products were found

SARA 304 RQ : Not applicable

### SARA 311/312

Classification : Not applicable

### Composition/information on ingredients

No products were found.

### State regulations

Massachusetts : This material is not listed  
 New York : This material is not listed  
 New Jersey : This material is not listed  
 Pennsylvania : This material is not listed  
 California Prop. 65 : No products were found

### Canada

WHMIS(Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic)  
 Class D-2A: Material causing other toxic effects (Very Toxic)

### Canadian lists

Canadian NPRI : This material is not listed.  
 Canadian ARET : This material is not listed.  
 CEPA Toxic substances : This material is not listed.  
 Alberta Designated Substances : This material is not listed.  
 Ontario Designated Substances : This material is not listed.  
 Quebec Designated Substances : This material is not listed.  
 Canada Inventory : This material is listed or exempted.

### International regulations

International lists : Australia inventory (AICS): Not determined.  
 China inventory (IECSC): Not determined.  
 Japan inventory: Not determined.  
 Korea inventory: Not determined.  
 Malaysia Inventory (EHS Register): Not determined.  
 New Zealand Inventory of Chemicals (NZIoC): Not determined. Philippines Inventory (PICCS): Not determined.  
 Taiwan inventory (CSNN): Not determined.

## 16. Other information

Hazardous Material  
 Information System (U.S.A)

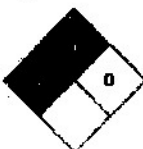


Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing

significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868. The customer is responsible for determining the PPE code for this material.

National Fire Protection  
Association (U.S.A)

Health



Flammability

Instability

Special

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#### History

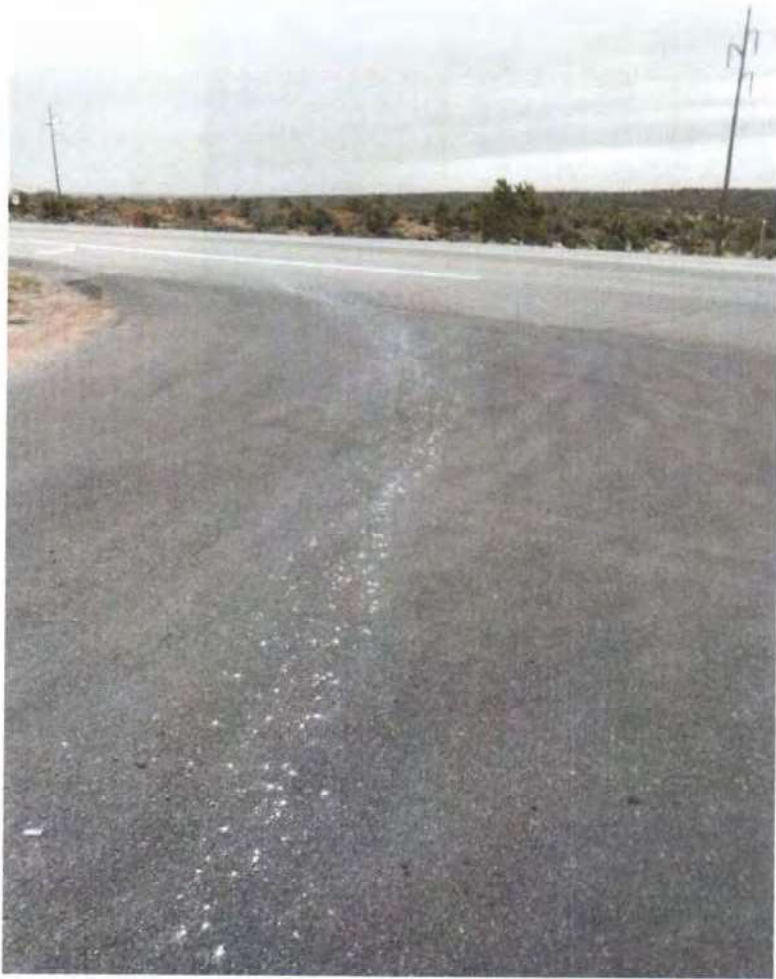
Date of Issue : 01 October 2015  
Date of previous issue : 12 December 2013  
Version : 3  
Revised Section(s) : 2, 16

#### Notice to reader

To the best of our knowledge the information contained herein is accurate. However, neither the above named supplier, nor any of the subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.













































































Ryan Johnson &lt;rmjohnson@utah.gov&gt;

**Notification of leaking 11e.(2) shipment arriving at the White Mesa Uranium Mill**

1 message

**Ryan Johnson** <rmjohnson@utah.gov>

Tue, Mar 29, 2016 at 2:07 PM

To: Linda.Gersery@nrc.gov, ryan.schierman@wyo.gov

Cc: "Goble, Phillip" &lt;pgoble@utah.gov&gt;, Scott Anderson &lt;standerson@utah.gov&gt;

Linda,

This morning the RSO of the White Mesa Uranium contacted the Utah Division of Waste Management and Radiation Control (DWMRC). He informed the DWMRC that a 11e.(2) shipment arrived at their facility with evidence that some of the contents had leaked from the shipping container. This shipment originated from the Cameco-Smith Ranch in Wyoming, with the contents of the shipment to be disposed of in White Mesa's tailing cells.

We are notifying you of this incident because Cameco-Smith Ranch is an NRC licensed facility (NRC RML SUA 1548). This is the second incident that the DWMRC is aware of with 11e(2) shipments originating from the Cameco-Smith Ranch facility in Wyoming. The last incident occurred on August 20, 2015. We will send you more information when the Mill send us their formal report on the incident

—

Ryan Johnson, P.G.  
Environmental Scientist/Health Physicist  
Utah Division of Waste Management and Radiation Control

**Disclaimer:**

Statements made in this e-mail do not constitute the official position of the Director of the Division of Waste Management and Radiation Control. If you desire a statement of the Director's position, please submit a written request to this office, on paper, including documents relevant to your request

## Appendix E



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511



August 25, 2017

EA-16-156

Mr. Brent Berg, President  
Cameco Resources  
Power Resources, Inc.  
550 N. Poplar Street  
Casper, WY 82601

**SUBJECT: CONFIRMATORY ACTION LETTER CLOSURE - POWER RESOURCES, INC.**

Dear Mr. Berg:


The purpose of this letter is to inform you of the U.S. Nuclear Regulatory Commission's (NRC's) decision to close the Confirmatory Action Letter (CAL) issued to Power Resources, Inc. (PRI) on August 30, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession ML16238A359).

As you know, the NRC issued the CAL to PRI based on the occurrence of repetitive transportation incidents, which included failures to accurately determine the radioactive material content for barium sulfate sludge shipments and describe the physical and chemical form of the material on shipping papers, and failures to effectively package barium sulfate sludge in a manner that would ensure the radioactive contents would not leak from the container while under routine transport conditions. The CAL documented several actions you agreed to perform, which included performing a root-cause analysis to identify specific causes for the inadequate packaging and transportation of barium sulfate sludge, assessing the radioactive material present in the barium sulfate sludge shipments, developing a corrective action plan and a corresponding schedule to restore compliance and prevent recurrence, and providing the NRC with a copy of the independent review performed of your transportation program.

The NRC reviewed your initial response to the CAL dated October 24, 2016 (ADAMS Accession ML16357A774), and your addendum to the CAL response dated July 24, 2017 (ADAMS Accession ML17216A343). The NRC conducted a transportation-specific inspection on November 15-17, 2016, which was documented in NRC Inspection Report 040-08964/2016-003, dated April 3, 2017 (ADAMS Accession ML17079A564). In addition, the NRC performed an in-office review of your corrective actions associated with the CAL and documented this review in a letter to you dated June 29, 2017 (ADAMS Accession ML17151B102).

As part of our assessment, the NRC reviewed the root-cause analysis performed by your staff and your independent expert's review of PRI's transportation program, both provided in response to the CAL, and found them to be adequate in addressing methods to eliminate excess liquid in the barium sulfate sludge and pond sediment shipments. During the NRC transportation-specific inspection conducted in November 2016, the NRC verified that your analytical methodology and

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 Number: 1    Author: vrobin03    Subject: Sticky Note    Date: 2/19/2020 2:48:40 PM -07'00'

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Appendix E

August 2017 letter from the NRC to Cameco Resources  
occurrence of repetitive transportation incidents,

calculational models used to determine the radioactive material content in the barium sulfate sludge had been revised to adequately calculate the radioactive material content.

Power Resources, Inc.'s recent changes to its transportation program associated with the package selection process, waste classification, and its pre-transportation packaging process have been reviewed and determined to be adequate, as documented by the revised procedures to ensure appropriate waste classification, packaging, and labeling. The NRC has determined that PRI's corrective action plan, schedule to restore compliance, and changes made to prevent recurrence were adequate by establishing a written program along with appropriate package testing to ensure the safe transport of barium sulfate sludge and pond sediment to disposal facilities.

In summary, based on our independent assessment of your corrective actions, the NRC has determined that PRI has satisfied the actions described in the CAL. Therefore, the NRC considers the CAL closed. As such, PRI, may resume shipments of barium sulfate sludge material in accordance with its license. The NRC will continue to assess the effectiveness of these corrective actions during future inspections.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC web site at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this matter, please contact Mr. Ray L. Kellar, Chief, Fuel Cycle and Decommissioning Branch at 817-200-1191.

Sincerely,

/RA/

Scott A. Morris  
Deputy Regional Administrator

Docket: 040-08964

License: SUA-1548

cc:

D. Pavlick, Cameco Resources

S. Anderson, Director,  
Utah Department of Environmental Quality

S. Ramsey, Manager  
Wyoming Department of Homeland Security

R. Schierman, Manager  
Wyoming Department of Environmental Quality

CONFIRMATORY ACTION LETTER CLOSURE - POWER RESOURCES, INC., DATED -  
AUGUST 25, 2017

**DISTRIBUTION:**

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RErickson, DNMS  
BTharakan, DNMS  
MVasquez, DNMS  
MHerrera, DRMA  
MDapas, NMSS  
AHuffert, NMSS  
JTappert, NMSS

RidsNmssOd Resource;  
RidsOcaMailCenter Resource;  
EDO\_Managers;  
RidsRgn1MailCenter Resource;  
R4DNMS\_FCDB;  
BMaier, ORA  
MHay, ORA  
JKramer, ORA  
CALldredge, ORA  
KFuller, ORA  
JWeaver, ORA  
VDricks, ORA  
MBurgess, NMSS  
SHoliday, NMSS  
JBowen, OEDO  
AKock, NMSS  
FBrown, OEDO  
DBrown, NMSS

RidsOgcMailCenter Resource;  
RidsOigMailCenter Resource;  
RidsOcoMailCenter Resource;  
RidsRgn3MailCenter Resource;  
  
PHolahan, OE  
FPeduzzi, OE  
SWoods, OE  
LSreenivas, OE  
KNorman, OE  
RArrighi, OE  
NHilton, OE  
JWeil, CA  
AMoreno, CA  
JPeralta, OE  
DMandeville, NMSS  
SMoore, NMSS  
BVonTill, NMSS

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ADAMS ACCESSION NUMBER: **ML17229B615**

☒ SUNSI Review:

ADAMS:

☐ Non-Publicly Available

☒ Non-Sensitive

Keyword:

By: BDB

☒ Yes ☐ No

☒ Publicly Available

☐ Sensitive

|           |                |         |         |          |          |  |
|-----------|----------------|---------|---------|----------|----------|--|
| OFFICE    | C:FCDB         | TL:ACES | RC      | D:DNMS   | DRA      |  |
| NAME      | RLKellar       | MCHay   | KFuller | MShaffer | SAMorris |  |
| SIGNATURE | /RA by LEBfor/ | /RA/    | /RA/    | /RA/     | /RA/     |  |
| DATE      | 8/15/17        | 8/22/17 | 8/22/17 | 8/22/17  | 8/25/17  |  |

OFFICIAL RECORD COPY

## Appendix F



Energy Fuels Resources (USA) Inc.  
225 Union Blvd. Suite 600  
Lakewood, CO, US, 80228  
303 974 2140  
[www.energyfuels.com](http://www.energyfuels.com)

October 9, 2019

Div of Waste Management  
and Radiation Control

**SENT VIA E-MAIL AND EXPEDITED DELIVERY**

OCT 15 2019

DRC-2019-012708

Mr. Ty L. Howard  
Director  
Division of Waste Management and Radiation Control  
Utah Department of Environmental Quality  
195 North 1950 West  
P.O. Box 144880  
Salt Lake City, UT 84114-4820



**Re: Volume and Procedural Modification Request for 11e.(2) Byproduct Material Disposal, Radioactive Materials License UT1900479, White Mesa Uranium Mill, Blanding Utah**


Dear Mr. Howard:

The Nuclear Regulatory Commission ("NRC") regulations in 10 CFR 40 Appendix A, Criterion 2, focuses on avoiding proliferation of small disposal sites and thereby reduce perpetual surveillance obligations at in-situ uranium recovery ("ISR") operations and other small remote uranium extraction sites. Accordingly, ISR facilities do not have permanent 11e.(2) disposal facilities on site. Instead, upon final closure ISR facilities are decommissioned to free-release (clean closure) standards. In order to accomplish this, as a condition of their licenses they are required to enter into and maintain a contract for the disposal of their 11e.(2) byproduct materials at an existing off-site licensed 11e.(2) byproduct disposal facility, such as the White Mesa Mill (the "Mill"). In response to Criterion 2 referenced above, and to accommodate the license requirements of ISR facilities under this program, the Mill has received and disposed of 11e.(2) byproduct material from ISR facilities since 1993 under Section 10.5 of the Mill's Radioactive Materials License ("RML"), UT1900479. In order to better accommodate the operational requirements of ISR licensees, and based on the Mill's experience to date, EFRI would like to request three changes to the current RML conditions for 11e.(2) byproduct disposal activities as delineated below. In addition, since 1993 in-situ leach ("ISL") facilities are now referred to as ISR facilities; therefore references should be changed accordingly.

Section 10.5 of the Mill's RML states:

"In accordance with the licensee's submittal to the NRC dated May 20, 1993, the licensee is hereby authorized to dispose of byproduct material generated at licensed in-situ leach (ISL) facilities, subject to the following conditions:

---

 Number: 1    Author: vrobin03    Subject: Sticky Note    Date: 2/19/2020 2:50:24 PM -07'00'

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## Appendix E

Letter from Energy Fuels to the UT DEQ Div of Waste Management and Radiation Control  
disposal of 11e.(2) Byproduct Material at the White Mesa Mill

A. Disposal of ISL waste is limited to 5000 cubic yards from a single source.”

Energy Fuels Resources (USA) Inc. (“EFRI”) hereby requests that the RML Section 10.5.A be modified to read as follows:

- A. Disposal of 11e.(2) material from ISR facilities is limited to a total of 10,000 cubic yards (“cy”) per year from all sources provided that:
- i. the licensee may exceed this amount in any year if required to accept ISR waste from any facility in connection with the final reclamation/decommissioning of the facility; and
  - ii. the licensee may accept an unlimited amount of 11e.(2) byproduct material from any facility owned or operated by the licensee or an affiliate of the licensee.

This volume change reflects the original volume contemplated by the NRC in its RML, Amendment 33. Further, this volume change allows for the receipt of reclamation items from ISR facilities as necessary, without the delays associated with the submission of individual volume change requests.

To conservatively assure that sufficient disposal capacity is available, the annual tailings capacity evaluation will use 20,000 cy (unless there are any facilities that are going into final reclamation, in which case this amount will be increased accordingly, if necessary) for future receipts. This conservatism will be incorporated into the calculation as noted in Section 2.6 of the Standard Operating Procedure (“SOP”). The annual tailings capacity evaluation will include this amount converted from cubic yards to dry tons. This conservatism provides assurance that any 11e.(2) byproduct materials from ISR facilities will be accounted for prior to receipt.

Section 10.5 D of the Mill’s RML states that:

“All disposal activities shall be documented and records thereof maintained on-site. The documentation shall include descriptions of the ISL waste and the disposal locations, as well as all actions required by this License condition.”

Section 10.5.E of the Mill’s RML states that:

“ISL Disposal Requirements. The licensee shall perform ISL disposal activities in accordance with the current Director approved Standard Operating Procedure (SOP) for ISL disposal. Said plan includes the following minimum provisions:

- (3) Such ISL byproduct material shall be segregated from any mill material and equipment disposed of in the cells pursuant to License Condition 10.4, and the ISL byproduct material from each in-situ leach source shall be segregated from the byproduct material from all other in-situ leach sources;”

EFRI hereby requests a change to the above requirements in 10.5.D and 10.5.E.(3) to remove the location documentation and waste segregation stipulations to read as follows:

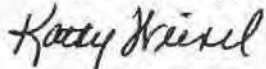
- D. All disposal activities shall be documented and records thereof maintained on-site. The documentation shall include the information required in the Director-approved SOP.
- E. ISR Disposal Requirements. The licensee shall perform placement activities of 11e.(2) byproduct material from ISR facilities in accordance with the current Director-approved SOP. Said SOP includes the following minimum provisions:
  - (3) Such ISR byproduct material shall be disposed of in the cells pursuant to License Condition 10.4;

The proposed change would allow more expeditious and efficient placement of 11e.(2) byproduct materials with no adverse effects. It is important to note that the liner protection elements in 10.5.E would remain in effect and thereby continue to be protective of the liner.

Redlined revised SOPs for 11e.(2) byproduct material disposal and tailings capacity evaluations are included in Attachments A and B for Division of Waste Management and Radiation Control ("DWMRC") approval.

If you should have any questions regarding this letter, please contact me.

Yours very truly,



**ENERGY FUELS RESOURCES (USA) INC.**

Kathy Weinel

Quality Assurance Manager

CC: Scott Bakken  
Mark Chalmers  
David Frydenlund  
Paul Goranson  
Garrin Palmer  
Harold Roberts  
Logan Shumway  
Terry Slade

Attachment A

## 1.0 Purpose

Energy Fuels Resources (USA) Inc. ("EFRI") receives 11e.(2) byproduct material ("byproduct material") from uranium in-situ ~~leach-recovery ("ISR")~~ operations for disposal under License Condition 10.5. The following procedure applies to acceptance, handling, and disposal of byproduct material at the White Mesa Mill (the "Mill").

## 2.0 Prior to Shipment of Byproduct Material

All byproduct material must be approved for disposal by the Mill Radiation Safety Officer ("RSO"), or his designee, prior to shipment to the Mill. The byproduct material must conform to Titles 10 and 49 of the U.S. Code of Federal Regulations ("CFR") and the Shipper must certify that the byproduct material does not contain hazardous waste as defined in the Resource Conservation and Recovery Act ("RCRA").

Information regarding the byproduct material to be disposed of should be received prior to receipt of the shipment at the Mill, and shall include:

1. The volume of material in cubic feet or yards, or quantity of drums and their size.
2. A description of the material (e.g. sludge, process materials, filter media, pipe, etc.)
3. A description of the shipping container (i.e. end dump trailer, intermodal container, side dump container, etc.)
4. Results of analysis for U-Nat, Ra-226, Th-230 and Pb-210 on all sludges and soils and other material that is suited to sample collection. If a representative sample of the material was taken in connection with a previous shipment of material, then the results of that previous representative sample may be relied upon, and may be referred to or restated in the documentation that accompanies the shipment of the material. For byproduct material which is not suited to sample collection (i.e. metals, process equipment, filter media, pipes, etc.) the Shipper will determine the range, the average and the total activity, measured in millirem/hour (mr/hr) at a range of one meter, for each shipment.
5. A copy of the completed shipping manifest that will accompany the shipment and the anticipated shipping date.

The Environmental Coordinator or their designee will verify, prior to receipt of any shipment of byproduct material, that the disposal of such byproduct material will not cause the Mill to exceed the limits of ~~5,000 cubic yards~~ of byproduct material ~~from a single source~~, set out in Mill License condition 10.5A.

## 3.0 Designated Disposal Area

The Environmental Coordinator, or their designee will designate from time to time one or more designated disposal areas (each a "Designated Disposal Area") being a general area within a tailings cell for the disposal of byproduct material. Each Designated Disposal Area must meet the following

criteria:

1. The Designated Disposal Area must be in an active tailings cell (i.e., a tailings cell that is not fully covered with interim cover);
2. The Designated Disposal Area must be on a tailings beach area of the cell or on an area of the cell that is underlain by tailings sands;
3. There must be at least 4 feet of tailings sands under the Designated Disposal Area;
4. The Designated Disposal Area must be located at least 12 feet from the sides or dikes of the tailings cell;
5. Survey information or other document review will be maintained to confirm that the elevation of the Designated Disposal Area once filled with byproduct material must not exceed the plane or grade of the elevation of the uppermost flexible membrane liner of the tailings cell;

~~6.1. Detailed engineering drawings must have been prepared and kept on file at the Mill that demonstrate for each Designated Disposal Area that:~~

~~a) There are at least 4 feet of tailings sands under the bottom of the Designated Disposal Area; and~~

~~b)a) The bottom of the Designated Disposal Area is located at least 12 feet from the sides or dikes of the tailings cells; and~~

~~e) Each disposed ISL byproduct material has been segregated from any mill material and equipment disposed of in the cells and the ISL byproduct material from each in-situ leach source will be segregated from the byproduct material from all other in-situ leach sources;~~

~~7.6. ISL~~ wastes will be disposed in cells that have received prior written approval from the Director for this purpose.

~~8. Prior written approval must have been obtained from the Director of the Utah Radiation Control Board (the "Director") for each Designated Disposal Area, under Mill License condition 10.5C, and evidence of such approval must be on file at the Mill.~~

~~9.7. Byproduct material from each ISL facility is disposed in Designated Disposal Areas specific to that ISL facility.~~ Designated Disposal Areas include either trench areas or tailings beach areas. The procedures for placement are not depend~~ant~~ on which area the byproduct material is placed in. The above procedures are the same for both trench areas and tailings beach areas.

Detailed engineering drawings must have been prepared and kept on file at the Mill that demonstrate for each Designated Disposal Area that: When a new Designated Disposal Area is needed, EFRI will delineate the usable area within the cell footprint with stakes, fencing, bollards or other material(s) such that it is clear that the area meets requirements in items 3 and 4 above.

~~There are at least 4 feet of tailings sands under the bottom of the Designated Disposal Area;~~  
~~and~~

~~The bottom of the Designated Disposal Area is located at least 12 feet from the sides or dikes~~  
~~of the tailings cells; and~~

#### **4.0 Notification to Director**

EFRI shall notify the Director in writing at least 7 calendar days prior to the proposed scheduled date for disposal of any byproduct material. Written evidence of this notification will be kept on file at the Mill.

#### **5.0 Byproduct Material Receiving**

1. When each truck driver enters the restricted area for the first time, the scale house operator will provide hazard training for the driver. The driver will be provided with the Safety Training Form (Attachment 1). All drivers will be required to read the Safety Training Form and sign and date the Safety Training Form indicating that they understand and agree to follow EFRI's safety rules and procedures while on company property. The scale house operator will sign the Safety Training Form as the instructor for EFRI. Completed Safety Training Forms will be turned in to the Safety Department for future reference.
2. The onsite transportation expert shall inspect all copies of the Shipping Manifest and the transporter's Bill of Lading to ensure that the shipment is destined for the Mill and confirm with the Environmental Coordinator, or their designee that the shipment has been approved for receipt.
3. Record the inbound date and both the truck and trailer numbers on the Scale house Weight Ticket (SWT).
4. Enter the loaded weight of the truck and trailer on the SWT.
5. The scale house operator will contact the Environmental Department so that the shipment can be escorted by Environmental personnel to the Designated Disposal Area specified by the Environmental Coordinator.
6. Prior to transporting material to the Designated Disposal Area (pending on weather), the driver will be instructed to open or untarp the load. The Environmental personnel and the transportation expert will visually inspect, to the degree possible, the byproduct material to ensure that the material matches the material description on the shipping manifest. Any discrepancies between the byproduct material received and the manifest information will be reported to the Environmental Coordinator.

- a. Any byproduct material suspected of not conforming to Section 2.0 of this SOP will not be transported to the disposal site, unless a determination is made by the Environmental Coordinator that the material in question conforms to Section 2.0 of this SOP.
- b. Barrels containing soil or sludges shall be checked to determine if they are full prior to transporting them for disposal. Barrels not completely full shall be documented and shall be filled with tailings or soil prior to disposal. (License Condition 10.5.B).
- c. If weather conditions exist that makes the opening of the conveyance impossible at the untarping station, the Environmental personnel may take the conveyance to a suitable location in which to inspect the load. A suitable location will be one where the load may be viewed where employees are safely out of the way when the conveyance doors are opened and where if material was to fall out of the conveyance, that contamination issues will not be incurred. An example area could be the tails impound area near the disposal site.

## 6.0 Byproduct Material Unloading

1. The Environmental Coordinator will specify the specific location within the broader Designated Disposal Area for disposal of the shipment. ~~In designating the specific location within the broader Designated Disposal Area for disposal of the shipment, the Environmental Coordinator will ensure that all byproduct material will be segregated from any Mill material and equipment disposed of in the cell pursuant to Mill license condition 10.4, and that the byproduct material from each ISL source will be segregated from the byproduct material from all other ISL sources.~~
2. Environmental personnel will escort the shipment to the designated location in the Designated Disposal Area for unloading of the byproduct material.
3. Proposed Methods and Procedures to Fully Protect the Liner While Accessing Tailings Cells for Disposal of ISRL Byproduct Material and Mill Equipment
  - a. The shipment will be transported to the Designated Disposal Area only on established roadways onto the tailings cells.
  - b. At no time will a shipment be transported over or in a manner that will damage unprotected dikes, liners, other structures or settlement monitors associated with any of the tailings cells.
  - c. There must be at least 4 feet of tailings sands under the Designated Disposal Area ~~(documentation of the disposal area must be completed and on file prior to any disposal activities);~~
  - d. The Designated Disposal Area must be located at least 12 feet from the sides or dikes of the tailings cell ~~(active areas will be marked as noted above documentation of the disposal area must be completed and on file prior to any disposal activities);~~
  - e. No travel into the disposal area will be allowed unless the disposal cell liner is covered by at least 18 inches of soil or fill material at the point of access.

4. If the 7 calendar day notice referred to in Section 4.0 above has not been given, or the 7 days have not lapsed, then the shipment may be, but is not required to be contained in the shipping container (that is, the container-bin or trailer) on site until the required 7 day notice has been given and the 7 calendar days have lapsed.
5. If the shipment is determined to be acceptable, the following procedures will be followed:
  - a) If the 7-day notice has been given under Section 4.0 above and the 7 calendar days have lapsed, the byproduct material will then be unloaded in the designated area. If such notice has not been given or if such 7 day period has not lapsed, then the byproduct material will be unloaded in an area of the tailings cell that is not covered with interim cover and from which the material can be removed if necessary. Once the required notice has been given and the required 7 days have lapsed, the byproduct material will then be placed into the designated area.
  - b) If the material is in a self-unloading container, the driver will be instructed to unload ensuring all personnel are clear of the trailer and the immediate area. Byproduct material will be dumped from the transport in a safe manner to minimize dust. If the material requires unloading by a fork truck, a ramp will be installed and unloading will proceed.
  - c) After unloading, the Environmental personnel will visually inspect the unloaded byproduct material to ensure that there is no newly discovered material which does not match the material description on the shipping manifest. Any discrepancies between the byproduct material received and the manifest information will be reported to the Environmental Coordinator. Any byproduct material suspected of not meeting the requirements set forth in Section 2.0 of this SOP will be kept segregated from other waste material until a determination is made of its acceptability for disposal.
  - d) After unloading, a photo of the unloaded material will be taken which is attached to the shipping documentation for verification of shipment contents.
  - ~~e) The location of the shipment of the byproduct material will be documented on the plat of each Designated Disposal Area illustrating the disposal area within the Designated Disposal Area where the byproduct material will be disposed of.~~
  - fe) Beta-gamma measurements will be taken at several locations around the unloaded material. This information will be recorded on the Radiation Department's copy of the shipment documentation. The measurement range in mrem/hr at 2 meters, and the average measurement, measured in mrem/hr at 2 meters, shall be recorded.
  - gf) Measurements using a photoionization detection meter ("PID") will be taken at several locations around the unloaded material to ensure that there are no organics present. The information will be recorded on the Environmental Department's copy of the shipment documentation. If organics are detected, the Environmental Coordinator must be advised, and no compaction or covering activities relating to the shipment shall occur until specifically instructed by the Environmental Coordinator. The Environmental Coordinator and Safety Coordinator will determine if any additional safety precautions are required to be taken by workers or otherwise as a result of the

detection of the organics, and will implement any such precautions. The Environmental Coordinator will also contact EFR's corporate regulatory personnel and the shipper to verify that the detected organics are 11e.(2) byproduct material from the shipper's ISRL facility. Once the Environmental Coordinator has verified that the organics are byproduct material compaction and covering activities will proceed.

- hg) A breathing zone sample will be taken periodically during unloading and cover activities. If the gross alpha exceeds 25% of the applicable DAC, then the RSO will be notified, and all other unloading activities of byproduct material from that particular ISRL site will require the use of respiratory protection, until further notice by the RSO.
- ih) After unloading the byproduct material, replace the tarp or close the trailer, unless the trailer is being decontaminated for unrestricted release.
- ji) Direct the driver back to the scales for an empty weight.
- kj) The scale house operator will record the empty weight on the appropriate SWT.
- lk) Shipment and disposal activities will be documented as described in Section 10, below.

## 7.0 Covering of Byproduct Material

1. After the byproduct material has been accepted by the Environmental Coordinator, or their designee, the byproduct material will be spread within the designated area within the Designated Disposal Area to facilitate compaction and covering.
2. The byproduct material will be compacted with at least four passes of the construction equipment prior to placing an additional layer.
3. Free volumes in the byproduct material will be minimized by filling, sectioning, or crushing. Random fill or tailings sands will be used to fill voids in and around the byproduct material.
4. All contaminated equipment shall be dismantled, crushed, or sectioned to minimize void spaces. Barrels containing waste other than soil or sludges shall be emptied into the disposal area and the barrels crushed. Barrels containing soil or sludges shall be verified to be full prior to disposal. Barrels not completely full shall be filled with tailings or soil.
5. A one foot thick, or thicker, cover comprised of native soil will be placed over the byproduct material working area. The fill and cover material will be compacted with at least one pass of the construction equipment.
6. The Environmental Coordinator or their designee will inspect the placement of the byproduct material prior to covering to physically verify that the procedures in this Section 7.0 have been adequately performed.

## 8.0 Decontamination and Release of Trailers and Trucks

**All trailers and trucks will be decontaminated after unloading prior to leaving the Mill.** Shippers or transporters will notify EFR<sub>I</sub> whether a specific trailer is to be released for restricted or unrestricted use. Any trailers that are to be released for restricted use will be decontaminated according to the requirements contained in DOT Part 49 CFR 173.428 or 173.443. Any trailers that are to be released for unrestricted use will be decontaminated according to the requirements found in Table 2 of the Nuclear Regulatory Commission's (NRC's) Regulatory Guide 8.30 Rev. 1 "Health Physics Surveys in Uranium Recovery Facilities" or NRC document- "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" issued May 1987. Trailers requiring repair will be decontaminated for unrestricted release, to facilitate repairs by the transporter at the transporter's own site. Trailers may be repaired without undergoing full decontamination if repaired within the restricted area of the Mill.

For the appropriate decontamination procedures, refer to the following Standard Operating Procedures for the appropriate conveyance:

|                            |           |
|----------------------------|-----------|
| End Dump Trailer           | SOP PBL-9 |
| Intermodal Container       | SOP PBL-2 |
| Standard Container Trailer | SOP-PBL-2 |

## 9.0 Hazard Identification and Safety

### 1. Required Personal Protective Equipment (PPE)

In all areas of the Mill covered by this procedure, hard hats, safety glasses and steel-toed shoes are required at a minimum. These must be worn in the restricted area of the Mill. Prior to disposal, the RSO will determine what level of respiratory protection, if any, will be required.

### 2. Industrial Hazards and Safety

- d) Use caution when the trailers are backing to the unloading area.
- e) Ensure that all personnel within 50 feet of the area where an end dump trailer is about to dump its load are aware that unloading is about to commence. Move at least 25 feet away from the rear of the trailer during the initial unloading operation.
- f) Drivers must use caution during the unloading process and be aware of any overhead hazards.
- g) Do not place any part of your body inside the trailer when the trailer is being tipped and the tailgate is open. Only work around the tailgate after it has been properly blocked open.
- h) Use caution when entering or exiting equipment. Be sure to use the ladders and hand rails. **Do not jump off the equipment.**

- i) Always use a ladder when entering and/or exiting the interior of a trailer.

3. Mobile Equipment

- a) Only trained and authorized persons may operate mobile equipment.
- b) All mobile equipment shall be inspected by the operator and any safety defects corrected before the equipment is used. If safe to do so, the equipment may be driven to the shop for repairs. Otherwise, the equipment must be towed or repaired at the location.
- c) Audible backup alarms shall be in operating condition.
- d) Walk around any piece of equipment before starting or moving it. Make certain no one is in a dangerous position and there are no obvious defects or hazards.
- e) Use caution when entering or exiting equipment. Be sure to use the ladders and hand rails. **Do not jump off the equipment.**
- f) Seat belts shall be used at all times when equipment is in motion.
- g) Equipment shall be operated at a reasonable speed consistent with road and weather conditions, subject to a maximum speed limit of 15 mph.
- h) Keep the cabs of equipment clean. Loose items that could jam controls or create other hazards are not allowed.
- i) Report all accidents to your supervisor regardless of how minor they are. If property damage or personal injury is involved, do not move the equipment until your supervisor has released it.
- j) All gasoline engines must be shut off when refueling.
- k) Keep equipment clear of edges, drop offs, and unstable banks. Maintain adequate berms where required.

10.0 Documentation

1. a) Documentation of Shipments

For each shipment of byproduct material the following records will be maintained in the Mill's Environmental Department files:

- Shipper's Manifest and Bill of Lading.
- Laboratory/activity analysis of the byproduct material performed by the Shipper.
- Completed SWT.
- 7-day notice to Director.
- Photo of the byproduct material.

- Byproduct material radiological scan information.
- Breathing zone monitoring data, if applicable.
- Equipment release forms.

All documents and photographs should be dated and the Shipper's Manifest and or Bill of Lading number indicated on the document.

#### b) Documentation of Disposal

Byproduct material disposal will be documented on the Disposal Documentation Form provided in Attachment 2. Attachment 2 may be accompanied by photographs, a written description or both. Attachment 2 or other written description will include:

- How the material was placed in the tailing cells;
- If void spaces in the drums/barrels containing soil or sludge were filled with tailings sands;
- How the area was compacted;
- Document that materials placed on tailings are no more than 4 feet thick and subsequent lifts no more than 2 feet thick ~~(this information will be obtained for each ISL disposal area and maintained by the engineering department);~~
- Document that there are 4 feet of tailings under the bottom of each disposal area and the bottom of each disposal area is located at least 12 feet from the sides or dikes of the tailings area ~~this information will be obtained for each ISL disposal area and maintained by the engineering department);~~
- Document that the elevation of the material will not exceed the plane or grade of the elevation of the uppermost flexible membrane liner of the cell.
- Confirmation that the shipment was properly covered; and
- Where settlement markers were placed. The Mill will maintain a plat of each Designated Disposal Area, which illustrates the location of each shipment of byproduct material.

2. The Mill will maintain on file a copy of the Director's written approval of each Designated Disposal Area.

An annual summary of the amounts of byproduct material disposed of in each calendar year shall be sent to the Director on or before November 1 of the calendar year. (License Condition 10.5F). [summary due same year]

#### 11.0 Training

An annual basis, all onsite personnel that are involved in the receiving or disposing of this material shall be trained in the activities associated with this procedure. This training shall be documented and maintained on file.

**ATTACHMENT 1**  
**SAFETY TRAINING FOR DELIVERY PERSONNEL**

Welcome to Energy Fuels Resources (USA) Inc.'s, White Mesa Mill. In order to assure your safety while on our property, we would like to acquaint you with the safety rules and procedures, which you will be required to follow while on our property.

**1.0 General Safety**

1. Approved hard hats and safety glasses are required at all times except when inside the cab of your truck.
2. This is a smoke free facility. No smoking is allowed on the property. Eating anything, drinking, chewing candy, gum or tobacco is also not allowed in the Mill Restricted Area due to radiation hazards.
3. Maintain a safe speed at all times when driving in the Mill Restricted Area. The maximum speed limit is posted at 15 mph. Energy Fuels Resources (USA) Inc.'s equipment has the right of way on the ore pad and Mill roadways.
4. Be aware of the possibility of a truck turning over while dumping. Ensure that the truck is on level ground and brakes are set prior to dumping.
5. Check for potential overhead hazards prior to dumping.
6. If material is hung up in the trailer bed, it is not permissible to work in the bed while it is in the dump position. If it is necessary to get in the bed of the trailer to free a hang up, the bed must be lowered.
7. Be aware of slippery conditions on the ore pad during periods of inclement weather.
8. Be aware of the potential for ice build-up on and around the decontamination pad during periods of cold weather.
9. Use caution when entering or exiting equipment.

**2.0 Radiation Safety**

1. All drivers are required to scan for alpha radiation prior to leaving the Mill Restricted Area.
2. All equipment, i.e. trucks and trailers, will be scanned for radiation prior to leaving the Mill's Restricted Area.

\_\_\_\_\_  
Driver (Printed)

\_\_\_\_\_  
Driver (Signature)

\_\_\_\_\_  
Scale House Operator

\_\_\_\_\_  
Date

No.: PBL-10  
Rev. No.: R-3.45  
Date: ~~February 1,~~  
~~2018~~October 9, 2019

ENERGY FUELS RESOURCES (USA) INC.  
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**ATTACHMENT 2**  
**11e.(2) BYPRODUCT MATERIAL DISPOSAL DOCUMENTATION FORM**

Date: \_\_\_\_\_

Name of employee receiving the load: \_\_\_\_\_

Generator of the Byproduct Material: \_\_\_\_\_

Shipper's Manifest or Bill of Lading number: \_\_\_\_\_

Was the State of Utah given notice to the receipt/disposal activities associated with this load? Yes or No

Who gave and when was the notification given?

\_\_\_\_\_  
\_\_\_\_\_

Description of byproduct material disposal area/activities:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Has each drum been inspected to identify the presence of any void spaces? \_\_\_\_\_

Have all drums with void spaces been filled with tailings sands or soil? \_\_\_\_\_

Which tailings cell was the material placed in? \_\_\_\_\_

Was the material placed on a tailings beach area of the cell or on an area of the cell that was underlain by tailings sands?

\_\_\_\_\_  
\_\_\_\_\_

~~Was the material segregated from any Mill material or equipment disposed of in the cell?~~

~~\_\_\_\_\_  
\_\_\_\_\_~~

~~Was the material segregated from byproduct material from other ISL sources disposed of in the cell?~~

~~\_\_\_\_\_  
\_\_\_\_\_~~

|   |   |               |
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|---|---|---------------|

Manifest or BOL #: \_\_\_\_\_

Have the thickness and placement measurements been verified and documented for the disposal area by the engineer, specifically:

|  | Engineer's or<br>Environmental<br>Coordinator's<br>Initials |
|--|---|
| Was the material placed in a cell approved by the <del>executive</del><br><del>Secretary</del> <u>Director</u> for ISL waste disposal? _____<br>Documentation of approval _____                          |   |
| <del>Was the ISL material segregated from disposed Mill material and other<br/>ISL material?</del> _____<br><del>Refer to plat(s) used to confirm.</del> _____   |   |
| Was the maximum lift thickness above tailings less than 4 feet<br>thick? _____   |   |
| Was the maximum lift thickness of subsequent lifts less than 2 feet thick?<br>_____  |   |
| Has 4 foot of tailings sands been maintained under each disposal<br>area? _____<br><del>Refer to drawings used to confirm</del> _____  |   |
| Is the bottom of each disposal area at least 12 feet from the sides or dikes<br>of the tailings cell? _____<br><del>Refer to drawings used to confirm.</del> _____                                       |   |
| Will the elevation of the material exceed the plane or grade of the<br>elevation of the uppermost flexible membrane liner of the cell? _____<br>How was this confirmed (e.g., survey or review)<br>_____ |   |

-How was the area compacted? Was each lift compacted by heavy equipment (such as a Cat D-6) at least 4 times prior to placement of subsequent lifts?

\_\_\_\_\_  
\_\_\_\_\_

Were void spaces filled with tailings?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was the shipment properly covered?

\_\_\_\_\_  
\_\_\_\_\_

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Manifest or BOL #: \_\_\_\_\_

Are additional settlement monitors required to be placed ~~for this generator?~~

\_\_\_\_\_

If required, where were the settlement markers placed?

\_\_\_\_\_

\_\_\_\_\_

Radiological receipt survey measurements:

\_\_\_\_\_

\_\_\_\_\_

Breathing Zone:

1. Was a Breathing Zone Sample collected? Yes or No
2. If yes, what were the results of the sampling?

\_\_\_\_\_

\_\_\_\_\_

Was a photograph taken during the unloading activities? Yes or No

Attachment B

No.: PBL-3  
Rev. No.: R-~~54~~  
Date: ~~June 9~~October  
~~9, 2019, 2018~~

ENERGY FUELS RESOURCES (USA) INC.  
STANDARD OPERATING PROCEDURES  
**Title:** Tailings Capacity Evaluation

Page 1 of 2

**1.0 Purpose:**

The State of Utah Division of Waste Management and Radiation Control ("DWMRC") license for the White Mesa uranium mill ("Mill") is a Performance-Based License ("PBL"). The PBL allows Energy Fuels Resources (USA) Inc. ("EFRI") to evaluate and implement certain changes in the licensed operation without applying for and receiving a formal amendment to the DWMRC license. The following procedure outlines the steps to follow when accepting additional conventional ore or alternate feed materials, to ensure that the currently permitted capacity of the Tailings Management System is not exceeded. This Standard Operating Procedure (SOP) is in conformance with the Mill's DWMRC License.

**2.0 Tailings Capacity Determination Procedure:**

Whenever the Mill is considering receiving conventional ore, 11e.(2) material, or an alternate feed, the capacity of the Mill Tailings Management System will have to be evaluated to ensure that sufficient volume is available to store the projected incremental volumes of tailings material, as well as the projected volumes of waste material from final reclamation of the Mill facility, based on the approved Reclamation Plan. This evaluation will be performed on an annual basis by the Mill Manager, or his designee, and approved by the President and CEO of EFRI, or his designee. The Tailings Capacity Determination will be completed by ~~December 1~~January 31 of each calendar year utilizing the volumes of conventional ore, 11e.(2) material and alternate feed materials projected to be received in EFRI's approved operating budget for the ~~following that~~ year.

The procedure for determining whether there is sufficient capacity is described as follows and documented on the attached Tailings Capacity Form.

- 2.1 For the initial evaluation, the base volume ("BV") available will be based on the remaining capacity in the active tailings cell, as determined by the Mill Manager from land surveys and production records (~~copies of which are attached~~). For each subsequent evaluation, the previous evaluation will produce a current remaining tailings capacity value, which will become the new BV for each active tailings cell.
- 2.2 Mill Management will maintain a Tailings Capacity Evaluation Record ("TCER") book, in which all evaluation forms and supporting calculations will be maintained. Refer to the TCER to obtain the BV value to be used in each subsequent evaluation.
- 2.3 The volume of tailings discharged to the active tailings cells between the date of the BV and the evaluation date will be estimated based on the Mill's production reports.

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ENERGY FUELS RESOURCES (USA) INC.  
STANDARD OPERATING PROCEDURES  
**Title:** Tailings Capacity Evaluation

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- 2.4 The amount of 11(e).2 in-situ waste material deposited into the tailings system between the date of the BV and the evaluation date will be summarized. The quantities of material will be listed by supplier and will be based on the Scale House Weigh Tickets from each shipment.
- 2.5 The BV, minus the quantities in items 2.3 and 2.4 above, will become the current tailings capacity. This number will be used as the BV (item 2.1 above) for the subsequent evaluation.
- 2.6 The amount of alternate feed material or conventional ore committed to be processed and deposited into the tailings system will be summarized. The maximum projected quantities of material will be listed by supplier and stated in dry tons, i.e. less the estimated moisture content. Maximum Annual calculations will use 20,000 cy of 11(e).2 materials converted from stated in cubic yards to dry tons. In instances where the Mill will accept more material to accommodate decommissioning/reclamation of an ISR facility, the volume will be estimated based on projections from the supplier.
- 2.7 The sum of the quantities estimated in item 2.6 above will be subtracted from the current tailings capacity calculated in item 2.5 above, to determine the remaining capacity available.
- 2.8 The remaining available volume in each of the active tailings cells will be converted to an equivalent volume in dry tons using a factor of 86 dry pounds cubic foot of available storage, or 2,322 dry pounds per cubic yard (1.16 dry tons per cubic yard). This factor was calculated in the Tailings Capacity Evaluation prepared in May of 2000. The factor was subsequently confirmed from drilling conducted in preparation of the Tailings Data Analysis Report, MWM, April 2015.